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ABSTRACT

Selected titles among the 39 presentations are as follows: "Historical Study of Turnover among Cooperative Extension System Directors and Administrators" (Clark et al.); "Educational Orientation and Job Satisfaction of Extension Field Staff in Michigan" (Suvedi); "Teaching Styles and Teaching Effectiveness" (Barrett); "Relationships between Teaching Performance and the Selected Variables of Teaching Longevity and Performance on Required Teacher Certification Examinations" (Jewell); "Changing Teaching Effectiveness Behaviors through In-Service" (Barrett); "A Counseling Tool for Careers in Agriculture" (Bennett et al.); "Careers in Agriculture as Perceived by High School Juniors and Seniors" (Krueger, Riesenberg); "Factors and Persons Influencing High School Students To Enroll in Vocational Agriculture Programs" (Luft, Giese); "Agricultural Education Graduates" (Muller, Miller); "Competency, Coping, and Contributory Life Skills Development of Eighth Grade Youth" (Miller, Bowen); "Perceptions of Agribusiness Leaders toward Agricultural Education in Nebraska" (Dillon, Blezek); "Perceived Components Needed in Programs of Agriculture" (Brown, Stewart); "A Comparison of Native and Transfer Undergraduate Agriculture Students" (Johnson et al.); "A Structure for a Research Agenda for Agricultural Education" (Buriak, Shinn); "Early Agricultural Education Teacher Education 1900-1917" (Hillison, Herren); "The Undergraduate Preparation of Agricultural Education Teachers" (Oliver et al.); "Who Should Be Responsible for Coordinating, Delivering, and Funding Preservice Vocational Teacher Preparation Programs?" (Hughes, Barrick); "International Dimensions of Agricultural Education

Programs throughout the United States and Its Territories" (Sabella et al.); "Effectiveness of a State Agriculture in the Classroom Program" (Herren, Oakley); "Differences on Computing Anxiety, Efficacy and Utility Perceived by Freshman" (Sutphin); "Factors Preventing Microcomputer Use among Secondary Agriculture Education Teachers in the United States" (Fletcher, Deeds); "Self-Perception of Gender Bias among Women Agriculture Teachers" (Foster et al.); "Factors Related to Teaching Style Preference of Ohio Cooperative Extension Service Faculty and Program Staff" (Seevers, Clark); "Relationship of Attitude toward Teaching at Higher Cognitive Levels to Aspired and Assessed Cognitive Level of Instruction" (Whittington, Newcomb); "Effectiveness of Writing-to-Learn Activities in Teaching Secondary Vocational Agriculture Students" (Reaves et al.); "The Use and Misuse of Correlational and Regression Analysis in Agricultural Education Research" (McCracken); and "Administrator Characteristics in Exemplary Vocational Education" (Migler et al.). (NLA)

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Agricultural Education Research

for Changing Times

Volume XVIII

The Proceedings of The National
Agricultural Education Research Meeting

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Los Angeles, California

TABLE OF CONTENTS

Preface.. vii

Acknowledgments.. ix

PAPERS PRESENTED

Historical Study of Turnover Among Cooperative Extension System Directors and Administrators
Richard W. Clark, Emmalou Van Tiburg Norland and Keith Smith, The Ohio State University...................... 1

Stress and Turnover Among Cooperative Extension System Directors and Administrators
Richard W. Clark, Emmalou Van Tiburg Norland and Keith Smith, The Ohio State University...................... 10

Educational Orientation and Job Satisfaction of Extension Field Staff in Michigan
Murari Suvedi, Michigan State University.................... 19

Teaching Styles and Teaching Effectiveness
Leverne A. Barrett, University of Nebraska-Lincoln........... 28

Relationships Between Teaching Performance and The Selected Variables of Teaching Longevity and Performance on Required Teacher Certification Examinations
Larry R. Jewell, North Carolina State University............ 36

Changing Teaching Effectiveness Behaviors Through In-Service
Leverne A. Barrett, University of Nebraska-Lincoln........... 45

A Counseling Tool for Careers in Agriculture
Mary Beth Bennett, Samuel M. Curtis, Arlen W. Etling and Edgar P. Yoder, Pennsylvania State University and Robert A. Martin, Iowa State University..................... 54

Careers in Agriculture as Perceived by High School Juniors and Seniors
David E. Krueger, Michigan State University and Lou E. Riesenberg, University of Idaho...................... 63

Factors and Persons Influencing High School Students to Enroll in Vocational Agriculture Programs
Vernon D. Luft, University of Nevada and Allen D. Giese, Agricultural Education Instructor, Wahpeton, North Dakota.................................... 71

The Relationship Between the Location of Students' High School and Their Academic Performance in a College of Agriculture
Matt R. Raven, Montana State University and R. Kirby Barrick, The Ohio State University................. 79

A Profile of Employment and Related Experiences of 1983 High School Graduates Described Within the High School Curriculum Concentration of the Graduates
Lou E. Riesenberg and Laurie A. Stenberg, University of Idaho.. 88

Agricultural Education Graduates: Comparisons of Academic Ability and Teacher Preparation of Those Who Teach and Those Who Do Not
Joe E. Muller, Texas A&M University and W. Wade Miller, Iowa State University.. 96

Relationships Between Personal, Family, and Extension Position Characteristics and Self-Perceived Effectiveness of Professional Extension 4-H Educators
Robin B. Keyser, Cathy F. Bowen and Rama Radhakrishna, The Pennsylvania State University............................ 105

Competency, Coping, and Contributory Life Skills Development of Eighth Grade Youth
Jeffrey P. Miller, Chevy Chase, Maryland and Blannie E. Bowen, The Pennsylvania State University.......... 112

Processes Used by Selected Illinois Extension Agents (Advisers) to Produce High Quality Programs
Dale A. Law, University of Illinois and Arnold F. Wissemann, Extension Officers, Australia........... 120

Perceptions of Agribusiness Leaders Toward Agricultural Education in Nebraska
Roy D. Dillon and Allen G. Blezek, University of Nebraska.... 127

Perceived Components Needed in Programs of Agriculture
Steve Brown, Jefferson City, Missouri and Bob R. Stewart, University of Missouri...................... 133

A Comparison of Native and Transfer Undergraduate Agriculture Students: Academic Aptitude, Achievement and Degree Persistence
Donald M. Johnson, Walter N. Taylor and Emmett T. Kohler, Mississippi State University................................ 142

How Firm the Foundation? A Look at the Knowledge Base in Agricultural Education Research
Gary E. Moore, North Carolina State University............... 151

A Structure for a Research Agenda for Agricultural Education: A National Delphi Involving Internal Experts
Philip Buriak, University of Illinois and Glen C. Shinn, Clemson University........................... 158

A Tri-State Assessment of Current Attitudes Toward Biotechnology Held by Teachers of Agriculture in the Public Schools
Maynard J. Iverson and Dale R. Carpentier, The University of Georgia, Boyd F. Robinson, Maryland State Department of Education and David R. Boreing, Agricultural Education Instructor, Jonesborough, Tennessee......................... 165

Early Agricultural Education Teacher Education 1900-1917
John Hillison, Virginia Polytechnic Institute and State University and Ray V. Herren, The University of Georgia.......... 173

The Undergraduate Preparation of Agricultural Education Teachers: What Transcripts Reveal
J. Dale Oliver, B. June Schmidt, Curtis R. Finch and Kuang-Chao Yu, Virginia Polytechnic Institute and State University.......... 178

Who Should Be Responsible for Coordinating, Delivering, and Funding Preservice Vocational Teacher Preparation Programs?
Matthew Hughes and R. Kirby Barrick, The Ohio State University.......... 187

International Dimensions of Agricultural Education Programs Throughout the United States and Its Territories
John Sabella, Stokes, North Carolina and Barbara M. Kirby, North Carolina State University.......... 196

Effectiveness of a State Agriculture in the Classroom Program
Ray V. Herren, The University of Georgia and Pamela C. Oakley, Agricultural Education Instructor Monroe, Georgia.......... 205

Heroes, Villains, Pretty Girls and Modern Farming Practices: The Contributions of Adolescent Agricultural Novels to Agricultural Education, 1925-1940
Gary E. Moore, North Carolina State University.......... 213

Differences on Computing Anxiety, Efficacy and Utility Perceived by Freshman: A Cross College Comparison
Dean Sutphin, Cornell University.......... 222

Factors Preventing Microcomputer Use Among Secondary Agriculture Education Teachers in the United States
William E. Fletcher, Agricultural Education Instructor Baskin, Louisiana and Jacquelyn P. Deeds, Mississippi State University.......... 229

Self-Perception of Gender Bias Among Women Agriculture Teachers
Richard M. Foster, Joost J. Pikkert and Dann E. Husman, University of Nebraska.......... 238

Educational Influences Affecting Decisions Regarding the Continuation of Alternative Agricultural Enterprises as Perceived by Oklahoma Farmers and Ranchers
Rodney Purswell and James Key, Oklahoma State University.......... 247

Factors Related to Teaching Style Preference of Ohio Cooperative Extension Service Faculty and Program Staff
Brenda Seevers, New Mexico State University and Richard W. Clark, The Ohio State University.......... 252

Relationship of Attitude Toward Teaching At Higher Cognitive Levels to Aspired and Assessed Cognitive Level of Instruction
Susie Whittington, University of Idaho and L.H. Newcomb, The Ohio State University 261

Relationship of Teacher Certification Methods to FFA and SAE Program Quality
Thomas M. McCall, University of Florida 268

The Relationship of Supervised Agricultural Experience Program Scope and Student Achievement in Practical Skills in Agricultural Science
Randi S. Randell, Agricultural Education Instructor, Live Oak, Florida and Jimmy G. Cheek, University of Florida 277

Effectiveness of Writing-To-Learn Activities in Teaching Secondary Vocational Agriculture Students
Rita R. Reaves, East Carolina University and James L. Flowers and Larry R. Jewell, North Carolina State University 287

The Use and Misuse of Correlational and Regression Analysis in Agricultural Education Research
J. David McCracken, The Ohio State University 296

ADDITIONAL PAPERS ACCEPTED FOR PUBLICATION IN THE PROCEEDINGS

Improving Safety Practices in Agricultural Mechanics Laboratories
Thomas H. Bruening, Tracy S. Hoover, Rama B. Radhakrishna,
The Pennsylvania State University............................ 306

Administrator Characteristics in Exemplary Vocational Education
Jerome R. Migler, George Wardlow, Gordon Swanson,
University of Minnesota.. 313

An Assessment of Teaching Strategies Used in Private Pesticide Applicator Education
John L. Creswell, Extension Crop Specialist, Urbandale, Iowa
and Robert A. Martin, Iowa State University.................. 321

Appendicies - A Complete Listing of the Paper Proposals Submitted for Consideration for the 1991 National Agricutlural Education Research Meetings, Los Angeles, California........................ 326

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PREFACE

The National Agricultural Education Research Meeting (NAERM) is a forum focusing on research in the field of Agricultural Education. The NAERM is held annually in conjunction with the American Vocational Association Convention. The quality of the meeting has continued to grow since the first meeting in 1974.

This year's program has involved individuals from a large number of states across the United States and several individuals from other countries. There were 70 presenters involved in the 1990 program. A total of 74 papers were submitted for consideration for presentation at this eighteenth meeting. Each paper was reviewed and evaluated by four members of the profession. Using the ratings assigned by these reviewers, the top 36 papers were accepted for presentation at the conference. This information represents a 48.6% acceptance rate. In addition, another three papers were accepted for publication in the proceedings as alternate papers. When these additional papers were included, the acceptance rate was 52.7%.

All paper proposal titles and authors are listed in the proceedings. Seven criteria were established *a priori* for use in making decisions regarding acceptance of papers for NAERM. These criterion included: 1) Had to follow paper specifications, 2) Had to be among the highest rated papers as ranked by evaluators, 3) Had to have at least 185 points out of a possible score of 308 points, 4) Had to have two ratings of either a 4 or 5 or combination of 4 and 5, 5) Had to have 3.00 or higher average rating, 6) Could not have two rejection ratings of 1 or 2, 7) Comments given should support paper's presentation. These criteria were identical to those used for the 1990 meeting.

The purpose of the NAERM are presented here to remind us of our focus*.

1. To present and disseminate the most recent and best research on the national level as judged by referees.

2. To present and disseminate critiques of the research by researchers in the profession.

3. To provide a forum for discussion of research in agricultural education.

4. To provide feedback to authors regarding research procedures and methodology used.

5. To provide suggestions to authors for preparing manuscripts for publications.

6. To give novice researchers an overview of current research issues, methodology, and critique within the profession.

7. To improve the quality of research conducted in future years.

8. To identify and recognize the Outstanding Paper Presentation at the National Agricultural Education Research Meeting on an annual basis.

9. To provide a written record of quality research completed and professional critique over time.

10. To broaden horizons and chart new directions for the conduct of agricultural education research in the future.

*Outlined and presented by Al Mannebach in the Preface to the 1987 NAERM Proceedings.

The standard of excellence for the 1991 NAERM was established by those who chaired previous meetings. The 1991 NAERM is the eighteenth meeting in a series of distinguished meetings. Previous meetings and their respective chairpersons are listed below:

PREVIOUS MEETINGS AND CHAIRPERSONS

1. 1974 - New Orleans, LA - Hollie Thomas, Florida State University
2. 1975 - Anaheim, CA - Hollie Thomas, Florida State University
3. 1976 - Houston, TX - Glen Shinn, Mississippi State University
4. 1977 - Atlantic City, NJ - William Richardson, Purdue University
5. 1978 - Dallas, TX - Bennie Byler, Mississippi State University
6. 1979 - Anaheim, CA - Ronald Brown, Mississippi State University
7. 1980 - New Orleans, LA - L.H. Newcomb, The Ohio State University
8. 1981 - Atlanta, GA - Maynard Iverson, North Carolina State University
9. 1982 - St. Louis, MO - Dale Oliver, Virginia Tech State University
10. 1983 - Anaheim, CA - Paul R. Vaughn, New Mexico State University
11. 1984 - New Orleans, LA - Jimmy G. Cheek, University of Florida
12. 1985 - Atlanta, GA - Bob Stewart, University of Missouri
13. 1986 - Dallas, TX - Alan A. Kahler, Iowa State University
14. 1987 - Las Vegas, NV - Alfred J. Mannebach, University of Connecticut
15. 1988 - St. Louis, MO - Edgar P. Yoder, The Pennsylvania State University
16. 1989 - Orlando, FL - Michael F. Burnett, Louisiana State University
17. 1990 - Cincinnati, OH - Robert A. Martin, Iowa State University

I hope that the proceedings of the 1991 NAERM will be useful to everyone in the agricultural education family as well as other professionals interested in research in agricultural education. I also hope that all presenters will submit their work for possible publication in a professional journal. It is time to begin preparing for the 1992 NAERM. Please submit paper proposals for consideration to John Mundt, University of Idaho. Any comments you may have about this year's procedures or suggestions for improvement of future meetings will be appreciated.

Larry R. Arrington, Chairperson
1991 National Agricultural Education Research Meeting

ACKNOWLEDGEMENTS

An undertaking of this magnitude required the involvement, cooperation, and assistance of many people. I want to acknowledge and show my appreciation to a number of individuals who helped make this meeting successful: to Bob Martin, 1990 NAERM Chairperson, who provided guidance and assistance whenever called upon; to Joe Harper, Chairperson, Research Committee, Agricultural Education Division, American Vocational Association and to the Research Committee Members for sponsoring and assisting in conducting the meeting; to Lloyd McCabe, Program Chairperson, Agricultural Education Division, American Vocational Association, who made many arrangements and coordinated the overall program planning efforts; to Carl E. Beeman, Professor and Head, Department of Agricultural and Extension Education, University of Florida, for providing the needed administrative support for the successful completion of this program; Lisa Tolbert, Secretary, Department of Agricultural and Extension Education, University of Florida, for managing the review process and preparing the Proceedings, to all participants in the program - reviewers, chairpersons, facilitators, discussants, presenters, outstanding paper evaluators, and registration workers - whose efforts resulted in and excellent conference; and to all members of the profession who submitted research paper proposals and permitted their work to be judged by their peers.

A special "thank you" is due to the following Agricultural Education professionals who served as reviewers and whose work provided the basis for the objective selection of papers to be presented.

REVIEWERS

* Kirby Barrick, The Ohio State University
* Blannie Bowen, The Pennsylvania State University
* Gary E. Briers, Texas A&M University
* Michael F. Burnett, Louisiana State University
* William Camp, Virginia Polytechnic Institute & State University
* Jimmy G. Cheek, University of Florida
* Jacquelyn Deeds, Mississippi State University
* Steven Harbstreit, Kansas State University
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* Dennis C. Scanlon, The Pennsylvania State University
* Glen C. Shinn, Clemson University
* Bob R. Stewart, University of Missouri
* Michael K. Swan, North Dakota State University

* William Thuemmel, University of Massachusetts
* Paul Vaughn, Texas Tech University
* Freddie Waltz, Georgia State Department of Education
* David L. Williams, Iowa State University

In addition, the following members of the profession gave their time, efforts and expertise in the conduct of the meeting. Their efforts were sincerely appreciated.

DISCUSSANTS

* Bob Birkenholz, University of Missouri
* Gary Briers, Texas A&M University
* Bill Camp, Virginia Polytechnic Institute and State University
* Jacquelyn Deeds, Mississippi State University
* Stacy Gartin, West Virginia University
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* Tom McCall, University of Florida
* Glen M. Miller, University of Arizona
* Leon Shumacher, University of Missouri
* Linda Whent, University of California

REGISTRATION PERSONNEL

* Max McGhee, University of Florida
* John Mundt, University of Idaho

Each of the individuals listed above contributed lots of time and effort to conduct this year's NAERM. It was through the contributions of time, energy and expertise by individuals across the profession that made the meeting a success. I extend my sincere appreciation to everyone who assisted in making this program a worthwhile and stimulating event. It was a real pleasure to serve as NAERM chairperson especially when I received so much support and assistance. Thank you.

Larry R. Arrington, Chairperson
1991 National Agricultural Education
Research Meeting

HISTORICAL STUDY OF TURNOVER AMONG COOPERATIVE EXTENSION SYSTEM DIRECTORS AND ADMINISTRATORS

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PROBLEM STATEMENT

Premature turnover of any employee in an organization is a problem that must be dealt with by utilizing resources which could be better used in achieving the objectives of the organization. But the turnover of the top executive has a more profound effect on all levels of the organization than any other position. In the Extension Service, that individual is the director/administrator of the state Extension organization. The state Extension director provides the philosophical direction that guides each state's Extension Service in a manner unique to that individual. A change in leadership in the director's position will affect the organization from the administrative levels to the local community Extension office. Continuity of effective leadership in the director's position means more efficient use of resources in conducting Extension educational programs.

Because of the importance of the continuity of an effective director's tenure, it should be important for the Extension organization to recognize the factors that lead to premature turnover, or the intent to turnover, by Extension directors. Through identification of these factors, preventive or corrective action can be taken to prevent the loss of individuals who contribute greatly to the success of the organization.

OBJECTIVE

The objective of the study was to explore and describe historical data on turnover and factors affecting turnover of Extension Director/Administrators from 1950 through the 1980's.

RELATED LITERATURE/THEORETICAL FRAMEWORK

A body of knowledge exists that describes the phenomenon of turnover within organizations. Models of turnover have been designed and modified by many researchers. One of the earliest models was the March and Simon model (1958). This model suggested that the two main factors influencing individual turnover were the perceived desirability of movement and the perceived ease of movement from the position or organization (March & Simon, 1958). This model included six variables that led to increased desirability of movement and six variables that led to ease of movement. Mobley (1977) expanded that model to include what he termed withdrawal conditions, including the variable, "intention to quit/stay," which is suggested to be the last step before the actual turnover behavior. Another conceptual model, using the work of March and Simon (1958), the Mobley (1977) variable of intention to quit/stay and the addition of job performance as a variable was proposed by Jackofsky (1984).

Several studies have been conducted on the factors that influence job turnover intentions of Extension personnel (Church, 1979; C. Clark, 1981; Squire, 1982; Van Tilburg, 1985). Van Tilburg (1985) recommended that a similar study be conducted for state and administrative personnel and compared to the results for county personnel.

METHODOLOGY

The population consisted of former state directors and administrators of the Cooperative Extension System and included both 1862 and 1890 institutions from 1950 through the 1980's. The study received information on a total of 210 directors and administrators. In this sample, 197 individuals were from 1862 institutions and 13 individuals were from 1890 institutions. A total of sixty institutions participated in the historical study: forty-nine 1862 institutions and eleven 1890 institutions. The study did not receive any data from one 1862 institution and five 1890 institutions. Due to the difference in titles of the individual administering the Extension Service in each state, the historical phase of the study collected data from the individual in each state who is in charge of the day-to-day operations of the Extension Service.

A standardized survey form was sent to every institution within the Cooperative Extension System requesting demographics, dates of employment as director and the official reason for leaving the position. Face and content validity was determined by a panel of experts. Changes in questions were made as recommended. In addition, the form requested that a copy of the individual's biography or resume be attached for purposes of tracking previous positions held, education levels, and areas of education. Reliability measures were not appropriate for this type of instrument, but the use of the individual's biography provided a method for determining the accuracy of the information provided on the survey form. Approximately six weeks after the deadline set for returning the initial form, a second mailing was sent to each institution which had not responded. In addition, institutions were contacted by telephone to encourage submittal of the requested data.

In order to obtain qualitative data relative to turnover of past directors, a purposeful sample of eleven directors were interviewed by telephone. These eleven individuals represented the following regional representation: four from the South, three from the North Central, two from the West, and two from the Northeast.

MAJOR FINDINGS

Personal Demographics

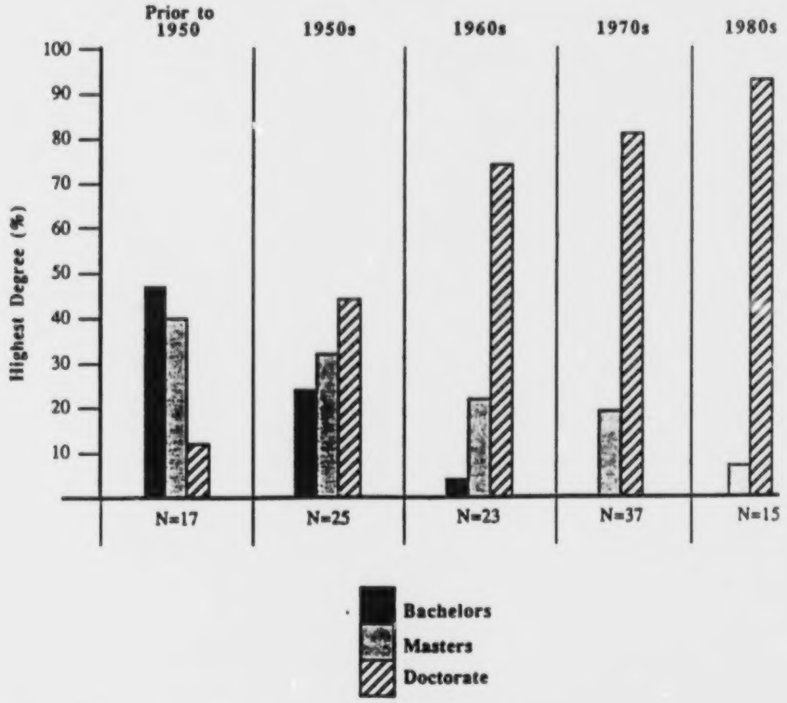
It was determined that all of the responding past directors and administrators were males. In addition, all of the directors that indicated their marital status on their biography or resume were married (N = 57). Based on the 40 individuals that indicated the number of children, 14 directors had two children (35.0%); 9 directors had four children (22.5%); 8 directors had five or more children (20.0%).

Career Demographics

There has been a continuous decline in the percentage of directors and administrators with bachelors or Masters degrees as their terminal degree, and a corresponding increase in the percentage of directors with doctoral degrees. As indicated in Table 1, in the 1980's over 90% of new directors had a doctoral degree. The directors' area of education in their bachelors degree has not changed much over the past decades, with agriculture being the most frequent response. Prior to 1950, 95% held bachelors degrees in agriculture. This percentage remained high in the 50's, 60's and 70's (96%, 91.5%, and 90%, respectively). In the 1980's, the percentage of directors possessing an agricultural bachelors degree dropped to 67%. Agriculture continues to dominate in the Masters and doctoral degrees. The percentage of agricultural Masters degrees was 100% for those directors entering the position prior to 1950. This percentage reduced in the decades of the 50's, 60's, 70's, and 80's (69%, 70%, 68%, and 72%, respectively). Of those directors who possessed a doctorate degree, the percentage who possessed agricultural doctorates was 100% prior to 1950, 60% in the 1950's, 58.5% in the 1960's, 62% in the 1970's, and 68% in the 1980's.

Table 1

•Highest Degree Attained by Directors'
Categorized by the Decade Entering the Position



The study received prior employment records of 121 directors. In compiling the position held previous to director, it was found that most directors had moved into their position through the organization; almost 60% of the directors were currently employed by Cooperative Extension and almost 40% of the directors were either an associate or assistant director prior to being named to their present position. Fifteen percent of the directors were either faculty or department heads within agriculture. Twenty percent were extension employees other than assistant or associate director. The remainder of the directors held a wide variety of positions prior to becoming director, including associate dean, college president, and a director for international programs.

As indicated in Table 2, since the 1950's there has been no significant change in the average age of directors at hiring (mean = 48.0 years) or the average age of directors at leaving (mean = 57.5 years). From 1960 to the present, no significant differences were found in the average length of tenure. However, there was a significant difference ($p < .05$) in the average length of tenure between the 1950's (12.7 years) and the 1980's (8.0 years).

Table 2

- **Directors' Average Age at Entry, Age at Leaving and Tenure**

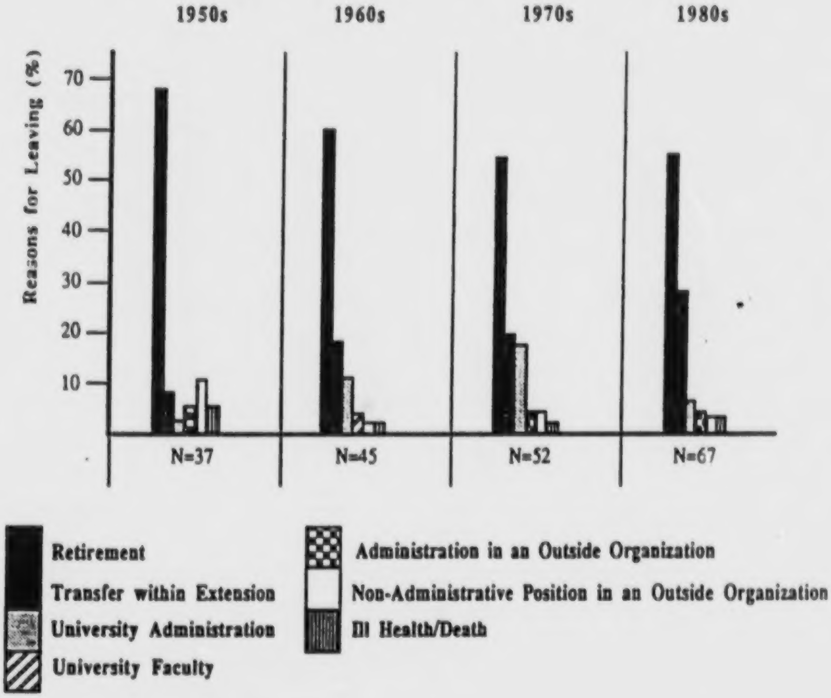
	1950s	1960s	1970s	1980s	Overall Statistics
Age at Hiring (years)	Mean= 48.2 sd= 10.068 Median= 49.4 Min.= 25.5 Max.= 62.0 Range = 36.5 N=26	Mean= 50.2 sd= 6.983 Median= 50.7 Min.= 32.2 Max.= 64.0 Range = 31.8 N=32	Mean= 46.9 sd= 5.429 Median= 46.7 Min.= 36.4 Max.= 59.6 Range = 23.2 N=46	Mean= 47.6 sd= 6.274 Median= 48.0 Min.= 36.0 Max.= 60.1 Range = 24.1 N=61	Mean= 48.0 sd= 6.961 Median= 48.0 Min.= 25.5 Max.= 64.0 Range = 38.5 N=165
Age at Leaving (years)	Mean= 59.8 sd= 10.031 Median= 64.0 Min.= 38.3 Max.= 70.5 Range = 32.2 N=26	Mean= 60.0 sd= 6.817 Median= 60.2 Min.= 42.7 Max.= 70.1 Range = 27.4 N=31	Mean= 57.2 sd= 6.301 Median= 57.3 Min.= 43.3 Max.= 68.4 Range = 25.1 N=46	Mean= 55.4 sd= 7.160 Median= 56.8 Min.= 36.2 Max.= 71.8 Range = 35.7 N=60	Mean= 57.5 sd= 7.582 Median= 57.8 Min.= 36.2 Max.= 71.8 Range = 35.7 N=163
Tenure (years)	Mean= 12.7 sd= 10.700 Median= 8.5 Min.= .75 Max.= 45.0 Range = 44.25 N=34	Mean= 9.0 sd= 5.928 Median= 7.4 Min.= 1.4 Max.= 23.8 Range = 22.3 N=37	Mean= 10.2 sd= 5.701 Median= 9.8 Min.= .42 Max.= 28.8 Range = 28.3 N=49	Mean= 8.0 sd= 5.343 Median= 7.0 Min.= .17 Max.= 23.5 Range = 23.3 N=63	Mean= 9.7 sd= 6.990 Median= 8.0 Min.= .17 Max.= 45.0 Range = 44.8 N=183

sd= standard deviation

By far, the most frequently reported reason for leaving was retirement. The second most commonly reported reason was transferring within the Extension Service. Since the 1960's, the percentage of directors retiring has remained relatively constant, ranging from 54% to 57%. Greater variation occurs in other reported reasons for leaving (Table 3).

Table 3

•Directors' Official Reason for Leaving Their Positions



Since the 1950's, the number of individuals entering the position of director or administrator has remained fairly constant and represented 22 first time directors in both the 1950's and 1960's, 23 in the 1970's, and 24 individuals in the 1980's. However, there has been a steady increase in the number of directors and administrators leaving their position during the decades of the 1950's to the 1980's (37, 45, 50, and 65, respectively). This large increase reflects an ever increasing number of directors who transferred from one directorship to another.

Relationship of Turnover to Selected Variables

In cross-tabulating the age when the position was taken with the reason for leaving the position, of the individuals who took the position before the age of 45 only 24.1% retired from the position. Over 38% of these individuals transferred to other extension positions. Of the individuals who took the position from between the ages of 45 and 50, 51.1% retired from the position. The second leading reason for leaving was transfer to other extension positions (28%). Over 87% of the individuals who took the position when 50 years old or older retired from the position.

As individuals took the director position later in their life, their average length of tenure tended to decline. For those individuals who assumed the director prior to age 45, their mean tenure was 11.8 years. Those entering the position between the ages of 45 and 50 had a mean tenure of 9.7 years. Individuals taking the director position after the age of 50 had a mean length of tenure of 7.2 years.

Within the group of individuals possessing a doctorate degree, those from administrative or agriculture education disciplines had significantly higher ($p < .05$) length of tenure (mean = 10.1 years) than those from agricultural disciplines (mean = 6.9 years). Of the individuals possessing a doctorate in administration or agricultural education, 83.3% retired from their position, but only 25.6% of the individuals possessing a doctorate in agriculture retired from their position.

The geographical region did not make a significant difference in the length of tenure. It ranged from 9.0 years in the North Central region to 10.4 years in the South.

Interview Data

The eleven directors who were purposefully sampled were asked to respond to a series of open-ended questions. These questions covered topics such as: educational background and preparation; job expectations; rewards and frustrations of the job; satisfaction with the job, co-workers, supervisors, Cooperative Extension, and salary; factors associated with the decision to leave; and advice for current and future directors of Extension.

The directors were asked how adequately their educational background prepared them for the responsibilities as a director. Most responded that the type of academic training they had did little to prepare them for being a director. A typical response was: ". . . did not have sufficient management-type training to take on a managerial role such as the director has to fulfill." The directors who indicated that their educational training was adequate were those who had educational administration as a part of their academic programs. When asked in what areas they felt they needed additional training, the directors mentioned additional training in communications, human relations, administration, program development, and supervision.

The directors were also asked what type of educational background and training they felt would be required and/or valuable for Extension directors of the future. Those mentioning particular subject matters included: communication, administration, budget allocation, personnel management, business and management, marketing, program administration, economics, and legal studies.

When asked what their job expectations were, most of the directors mentioned a desire to make changes in the Extension programs. Many also talked about the need to expand Extension programming and visibility within the university and the state.

When asked to identify the major reward of the job, responses included: satisfaction in accomplishing goals, changes in attitudes and quality of personnel and programs, improving the quality of programs, involvement and input in Extension at the national level, recognition from peers and clientele, and working with people. Improvement of personnel was mentioned by several of the respondents.

Major frustrations of the job were also identified. The most often mentioned frustrator was working with individuals, including administrators at a higher level, fellow directors, and personnel under the directors' control, who were not adaptable or accepting of change. Differences in policy between university deans and the director were mentioned several times.

When asked if these frustrations caused their jobs to be stressful, the respondents were split. Those that said yes indicated that personnel problems were the major source of stressful situations. Budget problems and dealing with such a wide variety of constituencies and programs were also mentioned as stressors.

When asked to indicate their satisfaction with salary, co-workers, working conditions, their direct supervisor, Cooperative Extension, the work itself, and overall job satisfaction, most of the directors rated their satisfaction as high in all of the areas.

When asked what factors contributed to a decision to leave the position, the respondents gave only a few different reasons. The most common was to accept another position that the individual felt was more attractive. Several indicated that they felt they had achieved what they had wanted and were satisfied to do something else.

The directors were also asked what advise would they give to current and future directors of Extension. Many of the responses were directed at the administrative structure of the Extension Service within the university. These comments stressed the need for Extension to be cooperative within the university community as a whole, not just within the colleges of agriculture. Another suggestion was for directors to develop skills as administrators and managers and learn how to build and utilize an effective management team.

When asked to summarize their experiences as directors of Extension in one or two words, the most frequently used word was "rewarding." Other key words were "satisfying" and "challenging." One respondent commented: "Exhilarating. Satisfying. Exciting at first, graduating into too much frustration."

CONCLUSIONS AND IMPLICATIONS

The following conclusions are based upon the historical data collected in this study:

1. There has been a dramatic increase over the last four decades in the number of directors/administrators who possess a doctorate degree. This increase began during the 1960's.
2. Agriculture is the predominant area of training for all degree levels. More diversity in area of degree is present in doctorates than in bachelors and Masters degrees.
3. The majority of Extension directors/administrators entered the position through advancement with the Extension organization. Previous service as either an associate director or assistant director was the primary route to the director position.
4. The length of tenure in the director/administrator position has declined, from 12 years in the 1950's to 8 years in the 1980's.
5. Retirement has consistently been the predominant reason for leaving the director position. However, in the 1980's there has been an increase in the number of individuals leaving the position to transfer back to other Extension positions.

6. While the number of new directors entering the position has been fairly constant over the last four decades, the number of individuals leaving the position has steadily increased, from 37 during the 1950's to 65 during the 1980's. This increase may be due to increased mobility of the directors, resulting in a higher number of position changes but not a large increase in the number of first time directors.
7. The younger the age of the individual entering the position, the more likely they are to leave the position because of some reason other than retirement. Most notably, these younger directors tended to transfer to other positions within Extension.
8. Of the individuals possessing a doctorate degree, those with administrative or agricultural education degrees had significantly longer tenure (10.1 years) as compared with those with agricultural related doctorates (6.9 years). The majority of directors (83.3%) with administrative or agricultural education degrees retired in the position, whereas only 25.6% of those with agricultural related degrees retired in the position.
9. There were no significant differences in the historical characteristics of directors/administrators when compared by geographical region of the country.

Through this study, historical trends and patterns were identified which will help select variables of merit for the study of current Extension Directors. It is hoped that intervention strategies can be developed and implemented which will reduce the amount of turnover among current directors.

Based on interview comments from former directors, future study must focus on the following factors: amount of managerial training prior to becoming director; job expectations; job satisfaction; stress; role boundary; role overload; and working relationship with university administrators.

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HISTORICAL STUDY OF TURNOVER AMONG COOPERATIVE EXTENSION SYSTEM DIRECTORS AND ADMINISTRATORS

A Critique

Jacquelyn P. Deeds, Mississippi State University -- Discussant

The researchers set a good theoretical foundation for their historical research. The paper was well organized and the graphics used added to the readers understanding of the data presented.

I had some questions about the methodology as presented in the paper. Who actually responded to the survey instrument? At one point I assumed that someone in each state's Extension personnel department might have responded, but some data was reported as coming from responding past directors, thus my confusion.

The paper indicates that a purposeful sample of 11 directors was interviewed by phone. I commend the researchers on this added dimension of the study but would like to know how the sample was selected. Selection procedures would help me better evaluate in the past directors responses.

The premise in the problem statement is that turnover of administrators in Extension is disruptive and cournter productive. One finding was that younger individuals leave director or administrator positions for reasons other than retirement. They frequently move to other positions in Extension. Is that good or bad? They are leaving one position and taking their expertise to another within the system--so can this be positive as well as negative?

This next item is a matter of personal preference. I prefer conclusions that are more than a rediscussion of the findings. I felt the conclusions in this paper were a restatement of the findings and did not provide additional understanding of what the research means to the profession or how it can really be used by the profession.

The researchers presented interesting data that should provide rich ground for discussion. The findings from the study and information from the interviews could provide a basis for recommendations about desirable educational background and experience for those who aspire to administrative positions in Extension.

Discussants often critique researchers for drawing conclusions beyond their findings. I would be more critical of this paper for not going far enough in using the data to draw additional conclusions and make recommendations.

STRESS AND TURNOVER AMONG COOPERATIVE EXTENSION SYSTEM DIRECTORS AND ADMINISTRATORS

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INTRODUCTION

Premature turnover of any employee in an organization is a problem that must be dealt with by utilizing resources to screen, select and train replacement employees which could be better used to achieve the organization's objectives. But the turnover of the top executive has a more profound effect on all levels of the organization than any other position. In the Extension Service, that individual is the director/administrator of the state Extension organization. The state Extension director provides the philosophical direction that guides each state's Extension Service in a manner unique to that individual. A change in leadership in the director's position will affect the organization from the administrative levels to the local community Extension office. Continuity of effective leadership in the director's position means more efficient use of resources in conducting Extension educational programs.

Because of the importance of the continuity of an effective director's tenure, it is important for the Extension organization to recognize the factors that lead to premature turnover, or the intent to turnover, by Extension directors. Through identification of these factors, preventive or corrective action can be taken to prevent the loss of individuals who contribute greatly to the success of the organization.

Several studies have been conducted on the factors that influence job turnover intentions of Extension personnel (Church, 1979; C. Clark, 1981; Squire, 1982; Van Tilburg, 1985). These studies concentrated on county Extension workers. One of the characteristics identified by these studies as important to the individuals' intention to turnover was job satisfaction. Van Tilburg (1985) recommended that a similar study be conducted for state and administrative personnel and compared to the results for county personnel.

The levels of burnout and factors leading to burnout among county Extension agents (Igodan, 1984) and administrators/mid-managers (R. Clark, 1985) have also been studied. R. Clark (1985) studied associate directors, assistant directors, and district supervisors from North Central Region states to determine the levels of burnout and the relationship between burnout and the factors of occupational stress, personal strain, personal coping resources, and personal characteristics. Clark also recommended that the study be replicated with Extension directors to highlight potential stress, strain, job satisfaction, and burnout problem areas and allow for corrective action.

PURPOSE AND OBJECTIVES

This study was designed to assess: 1) current levels of stress, strain, and burnout of current directors/administrators; 2) current job satisfaction; and 3) the intent to turnover of current directors/administrators.

PROCEDURES

The population for this study consisted of 77 current state directors and/or administrators of the Cooperative Extension Service and included both 1862 and 1890 institutions. Due to the small number of individuals in the population, a census was used for this study.

Data Collection

Data were collected by means of a questionnaire mailed to all individuals in the population. As of the deadline, 49 (64%) individuals had responded. A reminder letter and another copy of the instrument were sent to non-respondents. This generated 21 additional responses. Telephone calls were made to the remaining individuals in an attempt to obtain information, but no more responses were forthcoming. Thus the study received information from a total of 70 (90.9%) directors and administrators. Using the procedure specified by Miller and Smith (1983), late respondents were compared to early respondents on selected variables. No significant differences were found. Since later respondents are similar to non-respondents, the study assumed no significant differences existed between respondents and non-respondents.

Instrumentation

A total of five sections were used to gather data related to the variables of burnout, occupational stress, personal strain, personal coping, job satisfaction, and intent to turnover. Each of these instruments have been previously used with individuals in administrative positions and found to be both reliable and valid (Cronbach's alpha range: .71 to .94).

Qualitative Data

Ten directors/administrators were purposefully selected from regions and asked to respond to a series of open-ended questions. The questions covered such topics as: educational background and preparation for the job; educational requirements necessary for the position; job expectations; rewards and frustrations; satisfaction with co-workers, job, supervisors, CES, and salary; and advice for future directors. Audio tapes were made of the interviews to ensure accuracy of reporting.

RESULTS

Demographics

The majority of directors/administrators were male (91.4%). The typical director/administrator was approximately 53 years of age, had 2 or 3 children, and had been in his/her current position for 6 years. Over half of the directors/administrators had been an assistant or associate director prior to becoming director/administrator.

The majority of directors/administrators possessed a doctorate degree (89.7%). Slightly over 60% of the directors/administrators had an agriculture-related area of study in the highest degree (Table 1). Directors interviewed indicated a need for further training in the areas of administrative management, computer technology, business and finance, personnel management, labor law, and leadership.

Table 1
Academic Area of Highest Degree

Value Label	N	%
Education, Secondary, Post Secondary	6	9.5
Education Administration	8	12.7
Ag. Education or Ext. Educ./Admin.	7	11.1
Agr. or Related Areas	38	60.3
Liberal Arts or Social Sciences	3	4.8
Business or Administration	1	1.6
Total	63	100.0

Burnout, Stress, and Strain

The Maslach Burnout Inventory (MBI) measured burnout on three subscales. These are emotional exhaustion, depersonalization, and personal accomplishment. The emotional exhaustion subscale measured the extent one felt over-extended or exhausted. The degree to which one showed a lack of feeling or impersonal response to clientele or co-workers was measured on the depersonalization subscale. The personal accomplishment subscale was designed to measure one's feelings of competence.

Most directors/administrators were not suffering from burnout. Approximately 9–20% were in the high burnout category depending on the subscale. The highest degree of burnout (20%) was in the area of personal accomplishment (Table 2).

Table 2
Burnout Scores

Level of Burnout	Emotional Exhaustion		Depersonalization		Personal Accomplishment	
	N	%	N	%	N	%
High	6	8.7	8	11.6	13	20.0
Moderate	13	18.8	24	34.8	25	38.5
Low	50	72.5	37	53.6	27	41.5
Total	69	100.0	69	100.0	65	100.0

The level of occupational stress was measured by utilizing five subscales related to potential stress: role overload; role insufficiency; role ambiguity; role boundary; and responsibility. An overall occupational stress level was determined by combining the subscale scores.

Stress was present on the job, but most directors/administrators felt they handled stress well. Role overload and role responsibility had the largest number of directors/administrators indicating high stress levels (65.2% and 60.3%, respectively) (Table 3).

Table 3
Occupational Stress Subscales

Level of Stress	Role Overload		Role Insufficiency		Role Ambiguity		Role Boundary		Responsibility		Overall Stress Levels	
	N	%	N	%	N	%	N	%	N	%	N	%
Low	2	2.9	54	80.6	37	52.9	49	73.1	0	0.0	8	12.9
Low-Middle	22	31.9	13	19.4	32	45.7	18	26.9	27	39.7	54	87.1
Upper-Middle	41	59.4	0	0.0	1	1.4	0	0.0	39	57.4	0	0.0
High	4	5.8	0	0.0	0	0.0	0	0.0	2	2.9	0	0.0
Total	69	100.0	67	100.0	70	100.0	67	100.0	68	100.0	62	100.0

Personal strain is a result of unresolved stresses, which over time lead to detrimental physical, emotional and psychological conditions. The level of personal strain was measured using Osipow and Spokane's (1983) "Personal Strain Questionnaire." The instrument consisted of four subscales: vocational, psychological, interpersonal, and physical.

Personal strain was not a problem for the directors/administrators. All of the directors scored in the lower two quartiles on the personal strain instrument (Table 4).

Table 4
Personal Strain Subscales

Level of Strain	Vocational Strain		Psychological Strain		Interpersonal Strain		Physical Strain		Overall Strain Levels	
	N	%	N	%	N	%	N	%	N	%
Low	55	82.1	54	78.3	37	56.9	48	70.6	49	80.3
Low-Middle	11	16.4	15	21.7	28	43.1	17	25.0	12	19.7
Upper-Middle	1	1.5	0	0.0	0	0.0	3	4.4	0	0.0
High	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	67	100.0	69	100.0	65	100.0	68	100.0	61	100.0

Personal Coping

The level of personal coping resources available to deal with stress was measured using Osipow and Spokane's (1983) "Personal Resources Questionnaire." The instrument measured usage of recreation, social support systems, rational/cognitive coping, and physical coping.

Directors/administrators utilized numerous coping mechanisms. The highest usage was that of social support from friends or co-workers (98.6% high usage). The use of rational or cognitive skills to deal with stress also received high utilization scores (41.2% high usage) (Table 5). Interviews with directors indicated that they used "escapism" (getting away from the job) as a major coping mechanism.

Table 5
Personal Coping Subscales

Level of Coping	Recreational Level		Social Support		Rational Coping		Physical Coping		Overall Coping Levels	
	N	%	N	%	N	%	N	%	N	%
Low	4	5.7	0	0.0	0	0.0	7	10.1	0	0.0
Lower-Middle	37	52.9	0	0.0	2	2.9	35	50.7	10	14.9
Upper-Middle	24	34.3	1	1.4	38	55.9	21	30.4	47	70.1
High	5	7.1	68	98.6	29	41.2	6	8.8	10	14.9
Total	70	100.0	69	100.0	69	100.0	69	100.0	67	100.0

Job Satisfaction

The Job Descriptive Index (JDI) was utilized to gain measures of job satisfaction related to five categories: promotion, pay, the work itself, co-workers, and supervision.

Directors/administrators were satisfied with their jobs. The areas of work, co-workers, and supervision had the largest percentage of individuals in the high satisfaction range (60.9%, 87% and 75.4%, respectively). Satisfaction with promotion and pay received lower scores than the other subscales, with only 45.7% and 42.9%, respectively, in the high satisfaction range (Table 6).

Table 6
Job Satisfaction Subscales

Response	Promotion		Pay		Work Itself		Co-workers		Supervision	
	N	%	N	%	N	%	N	%	N	%
Low	6	8.6	4	5.7	0	0.0	0	0.0	2	2.9
Medium	32	45.7	36	51.4	26	39.1	9	13.0	15	21.7
High	32	45.7	30	42.9	43	60.9	60	87.0	52	75.4
Total	70	100.0	70	100.0	69	100.0	69	100.0	69	100.0

Satisfaction with the Cooperative Extension Service

A high level of satisfaction with the Cooperative Extension Service exists. Over 89% of the directors/administrators indicated high levels of satisfaction. Interviews with directors indicated a frustration with the lack of leadership and unification at the federal level. Improvement is being made in this area but directors felt there was still room for improvement.

Intention to Turnover

This portion of the questionnaire was designed to measure future intentions to leave the position. Only five (7.4%) directors indicated high scores on the intention to turnover instrument. The majority of the directors (80.9%) indicated low intentions to leave the position.

Relationships Among Variables

While overall levels of burnout, stress and strain were moderate to low, relationships between these variables were found. Higher levels of burnout are associated with high stress ($r = .55$) and strain levels ($r = .63$). High usage of coping measures was associated with lower levels of burnout ($r = -.47$). The degree of satisfaction with promotion ($r = -.28$), the work itself ($r = -.38$), supervision ($r = -.44$) and the Cooperative Extension Service ($r = -.38$) were all negatively related to occupational stress. Higher intentions to turnover showed only low relationships with burnout ($r = -.29$) and satisfaction with the Cooperative Extension Service ($r = -.26$).

No significant differences in scores on the study variables were found among groups based on their age, sex, marital status, number of children, tenure as director, degree area, institution type (1862 vs. 1890) or highest degree earned. The one exception was that directors with doctorates were more satisfied with their pay than those with master's degrees ($p < .05$).

CONCLUSIONS AND IMPLICATIONS

1. The majority of the directors/administrators were male (91.4%) and had been in their current positions for less than 7 years. Efforts should be made to increase the number of females as vacancies occur. Most of the directors had their educational training in the area of agriculture and had to rely on their on-the-job experience as an assistant or associate director to prepare them for the job of director. Directors perceived that they had insufficient educational preparation in the areas of administration management, computer technology, business and finance, and personnel management; therefore, opportunities to improve these skills should be made available.
2. While the overall level of burnout was low to moderate, 8.7–20 percent of the directors fell in the high burnout ranges on the three burnout subscales. The highest area of burnout (20%) was in the area of personal accomplishment. These directors do not feel good about their levels of accomplishment.
3. It appeared that directors/administrators were not experiencing high levels of stress and strain. The majority had some method for coping with their stress before it became strain. The most common coping mechanism were social support from friends and family, "escapism" (getting away from the job when necessary), or confronting stressful situations head on and solving the problems before they got worse.
4. Most directors were satisfied with the work, co-workers, supervision, promotion opportunities, and pay. The directors were most satisfied with the work, co-workers and supervision. Satisfaction with promotion and pay were areas of less satisfaction. This may be accounted for by less promotion opportunities as one approaches the top of an organization.
5. Overall, the directors were very satisfied with the Cooperative Extension Services in their state. The major area of dissatisfaction was with the leadership at the federal level. Interview results would suggest that the current federal leadership is making progress but there is still room for improvement. The federal level should clarify the leadership relationship between themselves and the states.
6. The current directors do not indicate high intentions to leave their current positions. However, five directors did score in the two highest categories of intentions to leave. Due to the small total number of directors, the turnover of five directors could have major impact.
7. Levels of burnout, stress, strain and use of coping methods were related. Higher levels of burnout were associated with higher stress and strain levels and lower personal accomplishment. Use of coping methods was also lower among those individuals with higher levels of burnout, stress and strain. Higher levels of burnout, stress and strain were associated with lower levels of satisfaction with promotion, the work itself, supervision, and satisfaction with the Cooperative Extension Service. Higher intentions to turnover are most closely related to higher levels of burnout and lower satisfaction with the Cooperative Extension Service. For those in the high level of burnout, workshops should be conducted related to coping with stress and strain on the job.

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STRESS AND TURNOVER AMONG COOPERATIVE EXTENSION SYSTEM DIRECTORS AND ADMINISTRATORS

A Critique

Jacquelyn P. Deeds, Mississippi State University -- Discussant

In this study the researchers provided a good theoretical framework for the topic of the study. The topic of stress, burnout, and turnover are very timely when so many Extension units nationwide are facing serious cutbacks in resources and staff. The directors and other administrators of the state systems are the ones responsible for the reallocation of the limited resources and often caught between the people they work for and the people who work for and with them. A very stressful situation, indeed.

The procedures outlined in this paper were clear and easy to follow. I do have a question about when the data were collected. Stress levels in 1991 are likely to be different that 1989 or even 1990.

In collecting the qualitative data for this study, the researchers purposefully selected 10 directors/administrators to answer several open ended questions. They attempted to ensure accuracy of the qualitative data by recording the interviews. Whenever anyone uses a purposeful sample I am curious to know by what means that sample was selected. Results of a purposeful sample are often open to suspicion if this is not clarified.

The objectives given in the paper address levels of stress and job satisfaction as well as intent to turnover. Findings are also reported on demographics, personal coping, and satisfaction with the Extension service. Relationships were reported between the indicated variables (stess, job satisfaction and turnover) and the variables and respondent demographics which were not mentioned as part of the objectives.

Although I might personally agree with conclusion that efforts should be made to increase the number of women in administrative positions I did not see data represented in the findings that would warrant this conclusion other than they are currently out numbered. Is that enough to warrant this conclusion?

Many of the conclusions were restatements of the findings. I wished the researchers had presented more insight based upon their experience as to what the findings mean to the Extension program nationwide.

The researchers are to be commended on expanding an established research area and focusing on a group that has considerable impact on the Extension program. I hope the researchers will share more about what the findings mean and how this information can be used in future articles and presentations.

EDUCATIONAL ORIENTATION AND JOB SATISFACTION OF EXTENSION FIELD STAFF IN MICHIGAN

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INTRODUCTION

The Cooperative Extension Service (CES) offers non-formal education programs to a diverse set of clients who are mainly adults. The extent to which the CES accomplishes its goals is ultimately derived from its individual staff members, mainly the field level agents who are the cutting edge of the organization. Studies have indicated that agents' perceptions of the professional commitment vis-a-vis productivity is closely related to their level of job satisfaction (Kemp, 1967; Keffer and Cunningham 1977; Terpstra, 1979) and that agents' performance is related to their level of job satisfaction (Van-Tilburg, 1988; Henderson, 1970).

The Extension agents may themselves be the means or they may simply establish a link between the client system and the source of need satisfying product or service (Lionberger and Gwin, 1982). The roles of the Extension agent, as described by Zaltman and Duncan (1977), include diagnostician, information specialist and solution builder, evaluator, system monitor, innovation manager, and facilitator. Based on the behavior expected, the roles of the Extension agent was described by Gallaher and Santopolo (1967) as an analyst, advisor, advocator, and innovator. Above all, Extension agents are professional adult educators rather than just a body of workers.

In order to be a successful educators of adults, Extension agents may need to possess a set of orientations about working educationally with the adults. Contemporary theories of adult learning suggest that adult learners are increasingly self-directed and independent; they are goal-oriented, activity-oriented, and their learning is active, problem-centered and oriented toward immediate application (Knowles, 1980; Brookfield, 1985, Levine, 1990). Knowles defines andragogy as "the body of theory and practice on which self-directed learning is based", whereas, pedagogy is "the body of theory and practice on which teacher-directed learning is based" (p.390). He suggests that andragogy, not pedagogy, is an appropriate model for helping adults learn.

Currently no studies have reported the job satisfaction of Extension agents as it relates to their educational orientations. This study, therefore, aimed at investigating the educational orientations, i.e., andragogy and pedagogy, held by Extension agents and the relationship between their educational orientation and their level of job satisfaction. Specifically, the study was organized around a set of five inter-related research questions. The research questions were:

1. What educational orientations do Cooperative Extension Service agents and their immediate supervisors hold?
2. Is there a relationship between an agent's personal characteristics and his/her educational orientation?
3. What is the level of job satisfaction of Cooperative Extension Service agents?
4. Is there a relationship between an agent's educational orientations and their job satisfaction?
5. Are Extension agents who have educational orientations that are similar to their immediate supervisor more satisfied with their job than agents who have educational orientations different from their immediate supervisor?

METHODS AND PROCEDURES

The population for this study was Cooperative Extension Service (CES) field agents in Michigan. A total of 153 Extension agents and 79 County Extension Directors (CEDs) with at least one year of work experience were identified for this study.

The data collection instrument was a self-administered mailed questionnaire. The instrument was adapted for use in this study by combining two previously validated instruments. One was designed to measure educational orientation of adult educators as it relates to andragogy and pedagogy (Hadley, 1975; Holmes, 1977) and the other was designed to measure job satisfaction of Cooperative Extension Service personnel (Cassina, 1989; Kesler, 1989). A panel of experts examined the adapted instruments to ascertain their content validity. These instrument were pilot tested for reliability and Cronbach's alpha was determined at 0.72, 0.73, and 0.94 for scales pertaining to andragogy, pedagogy and job satisfaction, respectively.

The questionnaires were mailed to the identified populations in September, 1990. A follow-up postcard reminding the respondents to complete and return the questionnaire was sent to non-respondents two weeks after the first mailing. The study had a final response rate of 73.2 and 81.0 percent for the Extension agents and the CEDs, respectively. A comparison of early respondents with late respondents on selected variables indicated no significant difference. This procedure allowed for the generalization of the results to the survey population (Miller and Smith, 1983).

Frequencies, means, standard deviations, correlations, chi-square, t-test, and analysis of variance were used to analyze data. The SPCC/PC+ computer program was used to analyze data.

FINDINGS

Extension agents and County Extension Directors (CEDs) in Michigan hold a moderate to strong orientation toward andragogy and pedagogy and the andragogical orientation was found relatively stronger than the pedagogical orientation. A mean andragogy score of 3.71 and 3.82 and a mean pedagogy score of 3.19 and 3.14, for the agents and the CEDs, respectively, on a 1-5 scale, suggest that CES field staffs hold stronger andragogical orientation than pedagogical orientation.

Table 1. Andragogical and pedagogical orientation score of the respondents

		Andragogy		Pedagogy	
Level	Range of scores	Agents No. (%)	CEDs No. (%)	Agents No. (%)	CEDs No. (%)
Low	< 2.5	0 (0)	0 (0)	14 (12.5)	7 (11.1)
Moderate	2.5 - 3.5	43 (38.4)	16 (25.4)	71 (63.4)	44 (69.8)
Strong	> 3.5	69 (61.6)	47 (74.6)	27 (24.1)	12 (19.1)
	Total	112 (100)	64 (100)	112 (100)	63 (100)

Mean andragogy score (Agents = 3.71, S.D. = 0.41; CEDs = 3.82, S.D. = 0.40)
Mean pedagogy score (Agents = 3.19, S.D. = 0.51; CEDs = 3.14, S.D. = 0.46)

The relationship between an agent's personal characteristics and his/her educational orientation was explored. Findings showed no significant linear relationship between demographic characteristics like age, experience in current position and the total Extension experience and educational orientations.

T-tests were performed to see if agents have different educational orientations when examined in relation to their sex, marital status, single or multi-county assignments, having a graduate degree, and prior experience as a school teacher. Findings show that married agents had different andragogy scores than their single counterparts with the former group being less andragogical than the latter. No differences were observed between other dichotomous characteristics and andragogy scores.

Table 2. T-test analyzing andragogy score when considering selected demographic characteristics

Characteristic/group		(n)	Andragogy score	t-Value	Prob.
Sex:	Male	(46)	3.69	.48	.63
	Female	(66)	3.72		
Marital Status:	Married	(86)	3.68	2.14	.04
	Single	(23)	3.90		
Assignment:	Single County	(92)	3.72	.50	.62
	Multi-County	(20)	3.66		
Graduate Degree:	Yes	(62)	3.66	1.35	.18
	No	(49)	3.78		
School teacher:	Yes	(51)	3.72	.18	.85
	No	(60)	3.71		

Table 3. T-test analyzing pedagogy score when considering selected demographic characteristics

Characteristic/group		(n)	Pedagogy score	t-value	Prob.
Sex:	Male	(46)	3.39	3.75	.00
	Female	(66)	3.04		
Marital Status:	Married	(86)	3.21	1.52	.13
	Single	(23)	3.02		
Assignment:	Single County	(92)	3.21	1.13	.26
	Multi-County	(20)	3.07		
Graduate Degree:	Yes	(62)	3.24	1.38	.17
	No	(49)	3.11		
School teacher?	Yes	(51)	3.21	.51	.61
	No	(60)	3.16		

Results of the t-test showed that male agents were different from their female counterparts in terms of pedagogy scores. The male extension agents were found to possess a stronger pedagogical orientation than female agents. No significant differences were observed between other dichotomous demographic characteristics and pedagogy scores (see table 3).

One-way analysis of variance and Scheffe procedures were used to examine differences in educational orientations in terms of program area affiliation. Significant differences at the 0.05 level were observed among Extension agents under different program areas in terms of andragogical orientation. Results of the Scheffe post-hoc test showed that the andragogical orientations of the Agricultural and Marketing and the Home Economics agents were significantly different from 4-H Youth agents with the former groups being less andragogical than the latter (see Table 4).

Table 4. Analysis of variance of andragogical orientation when considering the agent's program area

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	3	2.5271	.8424	5.6324	001
Within Groups	108	16.1522	.1496		
Total	111	18.6793			

Multiple Range Test: Scheffe Procedure

				Group			
Group	Program Area	(n)	Mean	4	1	3	2
Gr4	Home Economics	(36)	3.59				
Gr1	Agriculture/Marketing	(37)	3.62				
Gr3	NRPP	(8)	3.75				
Gr2	4-H Youth	(31)	3.94	*	*		

* Denotes pairs of groups significantly different at the .05 level

An attempt was also made to study whether an Extension agent could hold both andragogical and pedagogical orientations simultaneously at the higher or the lower level. For this purpose, agents whose scores were above and below the mean andragogy score were categorized as high andragogy and low andragogy, respectively. Similarly, agents scoring above and below the mean pedagogical score were categorized as high and low pedagogical orientation, respectively. A combination of the two high-low andragogical-pedagogical orientation categories resulted in a matrix of four types of educational orientations. Findings showed that it is possible for an Extension agent to hold a combination of strong dual orientation, strong andragogical orientation, strong pedagogical orientation or weak dual orientation. This indicated that andragogy and pedagogy could exist simultaneously and an agent may hold both orientations at high or low levels (see Table 5). It could be possible that andragogy and pedagogy are not merely two extremes on a single continuum but instead these are two separate phenomena that can be measured separately.

Table 5. Distribution of Extension agents in a matrix of educational orientation

Educational Orientation	Number	(%)
Weak dual orientation	26	23.9
Strong pedagogical orientation	41	37.6
Strong andragogical orientation	23	21.1
Strong dual orientation	19	17.4
Total	109	100

The third research question was to ascertain the level of job satisfaction of Extension agents. The agents were surveyed on their attitude toward their job by using an instrument designed to assess job satisfaction. The overall job satisfaction score ranged from 2.26 to 4.31 with a mean of 3.57 and a standard deviation of 0.50 (see Table 6). Findings showed that Extension agents were well satisfied with the content and context of their jobs. Of the 40 job satisfaction items, 9 items had a mean score of 4.0 or higher, on a 1 to 5 scale, indicating a higher level of job satisfaction, whereas seven items were rated below 3.0, i.e., below the "ACCEPTABLE" level of job satisfaction. The items with higher scores were related to agents' relationships with their clientele, freedom to choose their own methods, the Extension work itself, interpersonal relations, and opportunity for creativity in the job. The items with low scores were related to the opportunity to advance in the organization, the amount of time and work necessary to do the job, the organization's internal communication, adequacy of performance evaluation, and salary progress and salary compared to those in similar fields of work.

Table 6. Distribution of Extension agents' job satisfaction score

Level of job Satisfaction	Range of scores	Number(%)
Low	< 2.5	0 (0)
Moderate	2.5 - 3.5	55 (49.5)
High	> 3.5	56 (50.5)
	Total	111 (100)

Mean job satisfaction score = 3.57; S.D. = 0.50

The fourth research question of this study aimed at finding out the relationship between an Extension agent's educational orientation and his/her job satisfaction. Correlation coefficient indicated a low positive relationship between andragogy scores and job satisfaction scores (see Table 7). The pedagogical score showed no relationship with an agents' overall job satisfaction.

Table 7. Relationship between educational orientation and job satisfaction

Relationship	Correlation (r value)
Andragogy and job satisfaction	.30
Pedagogy and job satisfaction	.04

The final research question of the study attempted to find out whether Extension agents who have educational orientations which are similar to their immediate supervisor are more satisfied with their job than agents who have educational orientations different from their immediate supervisor. Andragogical congruence scores ranged from -1.91 to 1.25. The pedagogical congruence score ranged from -1.75 to 1.67. Extension agents belonging to the first and last quartiles of the andragogical and pedagogical congruence scores were classified as "incongruent" and the rest were classified as "congruent". The t-test was used to determine the differences in the level of job satisfaction between the "congruent" and "incongruent" groups. Findings showed that the level of job satisfaction of Extension agents whose andragogical orientation scores was "congruent" with their immediate supervisor was not significantly different from agents who were "incongruent" with their supervisors' andragogical score (see Table 8).

Table 8. T-test analyzing job satisfaction as to congruence of andragogical and pedagogical scores

Group	(n)	Job satisfaction	t- value	Prob.
Andragogy score:				
Incongruent group	(45)	3.66	1.57	.12
Congruent group	(46)	3.50		
Pedagogy score:				
Incongruent group	(48)	3.55	.50	.62
Congruent group	(43)	3.60		

Similar procedures were followed to determine the differences in the level of job satisfaction between agents who were "congruent" and "incongruent" with respect to the pedagogical orientation of their immediate supervisors. Findings showed that Extension agents whose pedagogical orientation scores were congruent with their supervisor were not different from the incongruent group with respect to job satisfaction (see Table 8).

CONCLUSIONS AND RECOMMENDATIONS

Recent studies in the CES setting have indicated that agents' performance is related to their level of job satisfaction. This study concludes that the Michigan CES field agents possess a moderate andragogical and pedagogical orientation and that andragogical orientation is related to an agent's job satisfaction. Such a finding offers insights for those involved in managing extension programs. Since andragogy is considered to be an appropriate orientation for adult educators and as it was related to job satisfaction, the hiring practices of the CES could consider individuals who not only have expertise in technical subject matter content but also possess appropriate educational orientations. A series of in-service programs, regardless of an agent's position, education or experience in adult learning principles seems appropriate considering the professional growth needs of Extension agents. Short courses like "How to teach technical information to adults" could be especially beneficial. Such in-service programs could help to further strengthen the Extension agents' andragogical orientation vis-a-vis job satisfaction.

Findings indicated that andragogy and pedagogy could exist simultaneously and an Extension agent may hold both orientations at high or low levels. It could be possible that andragogy and pedagogy are not merely two extremes on a single continuum but instead are two separate phenomena that can be measured separately.

The findings of this study indicated that andragogy and pedagogy are two different orientations. Although pedagogy was not found to be related to an agent's job satisfaction, higher pedagogy scores associated with higher andragogy scores were indicative of a higher level of job satisfaction. Thompson (1989) is probably right to suggest that an andragogical instructional approach is a necessary but not sufficient model for adult educators to utilize. According to Thompson, an andragogical approach is effectively complemented by the pedagogical instructional model and thus proposes a need for a complementary view of andragogy and pedagogy.

The congruence of educational orientation between pairs of Extension agent and their supervisor was not associated with the agent's job satisfaction. It could also be possible that CEDs in Michigan really do not act as immediate supervisors, or agents consider them more like colleagues. It could also be possible that Extension agents do not have supervisors and hence the question of congruence may be naive in this context. Therefore the issue of congruence warrants further research in other contexts where there is clearly a "supervisor-subordinate" relationship among Extension educators.

Educational orientations are the attitudinal dimensions which are formed on the basis of reflections of prevailing values, beliefs, and practices of extension agents with respect to their role as educators of adults. These orientations could change over time depending on how well these orientations serve the agents, the amount of contact the agents have with others holding different orientations, and the range of opportunities the agents are presented with to question their current orientation or force them to actually modify their orientations. The CES organization should help Extension agents to develop and hold an appropriate educational orientation by demonstrating to agents using appropriate incentives that holding an appropriate educational orientation is a worthwhile goal.

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EDUCATIONAL ORIENTATION AND JOB SATISFACTION OF EXTENSION FIELD STAFF IN MICHIGAN

A Critique

Jacquelyn P. Deeds, Mississippi State University -- Discussant

The topic of andragogy verses pedagogy has been one for discussion in the field of agricultural education for many years. Are these orientations mutually exclusive, opposite ends of an education philosophy, or can they be compatible? This study provides data that supports the idea that individuals can have strong dual orientation toward both andragogy and pedagogy.

The researcher is to be commended for using correct survey research techniques and getting a good response rate. I would like to know more about who made up the pilot test group, if all agents in the state were part of the study population.

I would like to have seen a more complete problem statement. I am not sure that "no previous studies" on the topic provides enough justification for the study.

The paper would have been strengthened if some of the significant findings had been more fully discussed in the conclusions. For example, I found it interesting that 4-H agents had a stronger andragogical orientation than Home Economics or Agricultural agents yet they work with youth rather than adults. Does this say something about their work with volunteers?

The t-tests analyzing andragogy and pedagogy and demographics indicated two significant findings that were not discussed in the conclusion. Does this mean the researcher felt that the statistically significant differences were not of practical significance?

One of the recommendations was that the CES help agents develop and hold an appropriate education orientation. I didn't see any findings that indicate what orientation is considered preferred in agents. Therefore, I am not sure what orientation the researcher feels is appropriate. This difference in agent educational orientation was shown as a one-way analysis of variance. I question the use of this inferential statistic because the researcher indicated they surveyed all of the agents and directors with one year experience in the state. If the ANOVA is used, some justification needs to be provided for the use of inferential statistics on a population.

Some additional discussion of why andragogical orientation was related to job satisfaction is needed. For example, agents rated freedom to use their own methods as being high in job satisfaction; this would be compatible with the researcher definition andragogy as being self-directed learning. I would have to consider that educational orientation might have more to do with how people do their job - the performance - rather than job satisfaction.

The other papers in this session point out that job satisfaction is a factor in turnover so studies that add to our knowledge of this subject are important.

TEACHING STYLES AND TEACHING EFFECTIVENESS

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INTRODUCTION/THEORETICAL FRAMEWORK

At the present time, answers to improving the process of teaching and learning are much sought after, but difficult to find. One line of inquiry has been to examine the relationships of teacher style to effectiveness of teaching. For example, using the Florida climate and control system observation instrument, De Novellis and Lawrence (1983) observed teachers in the classroom, they found a positive relationship between observed teacher behavior and predictable behavior explained by teaching style.

A study by Thompson (1984), using the Myers-Briggs Type Indicator (MBTI), found a similar link between teaching style and teacher planning. Using a naturalistic paradigm design, he interviewed teachers about their preferred roles in obtaining new teaching ideas, planning process, and typical methods of teaching. He demonstrated that teachers frequently performed these functions in ways consistent with their style.

Wright (1966) had school principals select their most successful and least successful teachers. The most successful and least successful teachers had distinctly different styles.

Lorentz and Coker (1977) attempted to show the relationship of personality type (teacher style) and observable teacher behavior. While little relationship was found, the study did demonstrate that students reacted markedly to teacher's personality differences.

Although previous studies attempted to link teaching style to teaching effectiveness, few studies have attempted to examine observable teaching behaviors with teaching styles. A review of the literature revealed that there had not been any studies done attempting to examine teaching effectiveness and its' relationship to teaching style in the vocational setting, and only a few in general education. so much of the emphasis in vocational education is directed toward development of curriculum materials with little attention as to the impact such development activities may have on teaching effectiveness, let alone consideration of impacts that may occur with diverse teaching styles.

PURPOSE AND PROBLEM STATEMENT

The purpose of this study was to examine the relationship between teaching style and teaching effectiveness and answer the question: Does teaching style affect teaching effectiveness? Teaching style as defined in the context of this study are those psychological traits measured by the Myers-Briggs Type Indicator (MBTI)and described by Lowry (1985). Teaching effectiveness is defined for this study as those observable teaching behaviors that process-product research has shown increase or decrease student learning.

OBJECTIVES

1. Determine the range of teaching styles of vocational teachers.
2. Determine if Teaching style has an effect on observable measures of teaching effectiveness.

METHODS AND/OR PROCEDURES

The sample was those high schools offering vocational subjects within 150 miles of a midwestern city, of which seven schools were randomly selected. Vocational teachers within these seven schools agreed to participate without coercion. The sample of 43 teachers included teachers of agriculture, home economics, industrial education and business education. Teachers ranged in age from 25-51, all were white, and there were 27 men and 16 women. The number of vocational teachers per school varied from three to seven with a range of teaching experience from 5-25 years.

Teaching effectiveness was determined by using the instrument, Classroom Observations Keyed for Effectiveness Research, COKER (Coker, Coker, 1988). The COKER is a low inference, sign instrument that has evolved over the years from five other observational instruments: OSCAR 5V (Medley, 1973); STARS (Spaulding, 1976); FLACCS (Soar, Soar & Ragosta, 1971); TPOR (Brown, 1970); and CASES (Spaulding, 1976), and improved by Coker and Coker. The COKER instrument gains its' validity from extensive work done on the previous instruments. Reliability is maintained by having each observer go through a comprehensive training program. Observer agreement is established before permission is given to an individual to observe teachers. The COKER is presently being used in several states to measure teaching effectiveness. The COKER is an instrument in which a trained observer simply records teacher behaviors without making judgments as to their appropriateness.

A minimum of four observation sheets were coded per class hour by trained observers. Each teacher was observed on two separate days for a minimum of two hours per day over a three-year period. Thus, each teacher had at least 48 separate records of his/her performance. Twenty-four teaching effectiveness competencies, identified from the literature and agreed upon by the subject teachers, were then given a score based on the observational data. Teaching style was measured through the use of the Myers-Briggs Type Indicator, Form G, (MBTI) (Myers, McCaulley, 1985). The MBTI is a widely used instrument for measuring teaching style (Golay, 1982; Kiersey, Bates, 1978; Lawrence, 1982; Myers, 1985; Silver, 1981, and Lowry, 1985). The MBTI is currently the most widely used psychological instrument in the country.

Four teaching styles were identified from the MBTI by Kiersey, 1978. These four styles were simplified in description by Lowry, 1985 as follows:

> Style 1 - **Brown.** Classroom is well organized and lessons highly structured. The core of good teaching is conducting one's self as a professional. They believe in being dependable and upholding consistent classroom management. Browns feel responsible for students' evaluation and are committed to preserving the time-honored idea on which the American education system has been founded.
>
> Style 2 - **Green.** Most proficient in teaching when free to develop competency and intelligence of students. They believe it is wise to create new curriculum which reflects the advances made in technology. Enjoy teaching when students can be exposed to new knowledge gained from research.
>
> Style 3 - **Blue.** Nurturing and supporting students is fulfilling. Creating a positive rapport with students is important especially when personal and social awareness is high. They have a compassion for others and make it a joy for them to work with people. Their self-esteem is raised by the magic that springs from students

learning experiences and growth.
Style 4 - **Orange.** Teach students immediately useful things, like to use "hands - on" way rather than theoretical approaches. They tend to teach what they do best.

Data analysis was done by using analysis of variance and Fisher's LSD test. Statistical significance was set at a p<.05 level. Comparisons were made with each of the 4 teaching styles as measured by the Myers-Briggs Type Indicator (MBTI) to teacher effectiveness competencies as measured by the COKER.

RESULTS

Data in Table 1 shows the distribution of vocational teachers by teaching style. Because of the random nature of the sample, the styles were not evenly distributed. although the distribution is consistent and predictable with other studies of individuals that teach applied subjects (Kiersey, Bates, 1978, Barrett, Sorensen, Hartung, 1985).

Table 1. Distribution of vocational teachers by teaching style.

TEACHING STYLES	
BROWN N=30	GREEN N=3
BLUE N=4	ORANGE N=6

Data in Table 2 indicates that teaching styles were significantly different (p<.05) for 8 out of 24 teaching effectiveness competencies. Teachers of the orange style consistently scored higher than the other 3 styles except for one Competency, number 23, individual differences.

For Competency 1 (demonstrates enthusiasm), orange teachers scored higher than either brown, blue, or green teachers. The enthusiastic and upbeat behavior of the oranges is well documented, and was probably a strong contributing factor for this difference. Kiersey (1989) refers to some oranges as "excitables." The observed behavior of these teachers was one of exuberance.

Orange teachers were higher than blues for Competency 4 (demonstrates proper listening skill). Kiersey and Bates (1978) note that oranges have an acute awareness of even minute variations on a theme, a sensitivity to syntonic, symphonic changes; sights and sounds seems to come naturally.

For Competency 5 (maintains an active learning environment), orange teachers were higher than the other three styles. Orange teachers are referred to by Kiersey and Bates (1978) and Golay (1982) as active spontaneous types. By observation, the orange teachers' classrooms were characterized as busy and full of action and hands-on experiences for students. Learning by doing could very well be the motto of the orange; thus, this result is not surprising.

Orange teachers were higher than greens in teaching effectiveness Competency 7 (provides positive feedback). This result is predictable from psychological type theory. Kiersey and Bates (1978) note that greens have difficulty giving and receiving praise. The oranges in this sample were observed to give considerable verbal and non-verbal praise and demonstrated acceptance of student performance.

Orange teachers were higher than blue for Competency 13 (demonstrates patience, empathy, and understanding). Much of the literature identifies the blue as the empathist as does Ro Bards (1986). It could have been predicted that the blue would have had the high score for this competency, but that was not the case. The orange score of 60.5 was one of the highest scores received for any teaching competency. As vocational teachers, oranges were in their element.

For Competency 15 (helps students recognize progress and achievement), orange teachers were higher than green teachers. The natural tendency of some oranges, is to give an abundance of appreciation for achievement, while green teachers tend to be more reserved in giving feedback to students.

For Competency 20 (provides examples of how task is to be completed), orange style was higher than blue. Kiersey's (1989) explanation of the teaching style of the oranges help to explain this difference. The natural method of teaching for a orange is to show the learners how to do things.

The last competency to show a difference in teaching effectiveness scores was Competency 23 (allows for individual differences in evaluation). Brown and green teachers were higher than blue teachers. One possible reason for the difference in these scores may be the fact that the brown, orange, and green teachers in the sample were part of a subset receiving special training on using style in teaching. By random selection, no blue teachers were in the groups receiving special training.

CONCLUSIONS

Among the four teaching styles there was not an even distribution in this random sample. There were more brown teachers and that finding is consistent with other studies.

In one-third of the teaching effectiveness competencies measured in this study, significant differences were found between teaching styles, and in the other two-thirds of the competencies, style was not a good indicator of differences in teaching effectiveness.

One consistent finding that occurred was that the teachers who preferred the orange style in this study, had consistently higher scores than the other styles of teachers. Unfortunately, there are not many orange style teachers, and they tend not to stay in teaching (Barrett & Sorensen, 1985, Kiersey, 1978).

Another interesting result was the consistently low scores of teachers who preferred the blue style. Some studies of teaching show that the blue style is more effective than others. There are two possible reasons for our results. First, the blue style teachers in this study were in most cases teaching vocational students who were largely of the orange and brown learning styles. Second, the distinct blue style that is based on discussion of theory and less on practice, may not be best matched to the vocational setting. Third, by random selection, no blue style teachers were in special sub-groups where extensive teaching effectiveness training was offered as part of a larger intervention strategy.

Table 2. Mean Scores of Teacher Effectiveness for High School Teachers by Teaching Style

Teacher Effectiveness Competency	Teacher Style Means			
	Brown N=30	Orange N=3	Blue N=4	Green N=6
1. **Demonstrates Enthusiasm for Teaching**	49.3b	60.2a	49.4b	47.5b
2. Provides Learning Experiences and Principles for Use Outside School	51.6	46.7	47.9	49.8
3. Provides Opportunities for Successful Experiences	49.0	53.1	49.9	53.3
4. **Demonstrates Proper Listening Skills**	50.5	58.3a	44.7b	47.8
5. **Maintains an Active Learning Environment**	49.7b	60.7a	48.5b	49.0b
6. Encourages Students to Ask Questions	50.9	54.7	54.2	48.2
7. **Provides Positive Feedback on Performance**	50.8	59.4a	48.4	44.2b
8. Develops and Demonstrates Problem Solving Skills	51.0	53.4	47.2	52.4
9. Gives Clear Directions and Explanations	51.2	50.4	51.4	47.6
10. Implements an Effective Classroom Management System for Positive Behavior	49.6	50.9	45.4	48.5
11. Provides a Clear Description of the Learning Task and Its Content	49.9	51.8	50.5	50.8
12. Uses a Variety of Instructional Strategies	51.4	49.5	47.6	50.5
13. **Demonstrates Patience, Empathy and Understanding**	49.3	60.5a	46.9b	52.5
14. Monitors Learner, Understanding and Reteaches	52.2	53.9	46.1	47.8
15. **Helps Students Recognize Progress and Achievements**	50.6	57.4a	47.5	46.1b
16. Provides Learners Practice and Review	51.1	52.1	49.6	47.0
17. Demonstrates Ability to Work With Individuals, Small or Large Groups	49.5	49.7	48.4	52.0
18. Assists Students in Discovering and Correcting Errors and Inaccuracies	49.9	51.4	45.7	51.4
19. Teacher Stimulates Student Interest	51.4	50.9	50.1	48.2
20. **Provides Examples of How Task is to be Completed**	50.4	57.5a	45.2b	52.6
21. Uses a Variety of Resources and Materials	51.2	46.7	54.5	46.1
22. Uses a Variety of Cognitive Levels in Strategies of Questioning	50.4	55.4	50.0	49.6
23. **Allows for Individual Difference in Evaluation**	51.4a	47.5	39.7b	52.5a
24. Uses Convergent and Divergent Inquiry Strategies	50.0	54.5	45.6	49.8

Note: Letter "a" is significantly higher than letter "b" ($P<.05$) with Fisher's LSD test.

What do the results of this study suggest for the improvement of teaching? We can say that the teaching styles of Kiersey and Lowry have a positive relationship to a number of important teaching effectiveness competencies, and that certain styles have greater ease or difficulty in achieving high effectiveness scores.

RECOMMENDATIONS

1. Teaching style should be measured during pre-service training so students, teachers and teacher educators are aware of style differences.

2. Teachers who prefer the teaching styles of blue or green should be made aware that their more theoretical styles may cause difficulties with vocational students who prefer a more "hands on" environment.

3. Teachers who prefer the brown teaching style may find that their high need for structure and order may cause difficulty and should be taught how to use a variety of teaching strategies to maintain active learning environments.

4. Teachers who prefer the orange style should be strongly encouraged to pursue a career in teaching even though they appear to be unorthodox.

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TEACHING STYLES AND TEACHING EFFECTIVENESS

A Critique

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Research to improve teaching and learning is a worthy undertaking. There are many people waiting for answers to research questions formulated by researchers. The author of this paper advocated that the evidence is strong that teachers perform their functions in ways consistent with their style. This investigation was guided by one general research question: Does teaching style affect teacher effectiveness? The researcher is to be commended for seeking answers to this question in the vocational education arena.

The paper provided a brief theoretical framework for the investigation and objectives to guide the work. Variables to be studied were named and carefully described. The population was defined and a random sample selected for the study. However, no rationale was given for the small sample. The researcher is to be commended for using standardized instruments that are commonly used in education. It appeared that appropriate techniques were used in collecting data for the study. Statistical tools used in analyzing the data were described. Some questions in this regard surface as one reads the paper: (1) Should the unit of analysis be teachers or schools? (Sample selection was based on schools.); (2) Are the numbers in each category sufficient? (Three of the teacher style groups had 6 or less.); and (3) Is there a composite measure of teacher effectiveness that can be used in the analysis?

The research was successful in determining the teaching styles of vocational teachers. The researcher confirms that his finding closely parallels results of other studies.

After observing significant differences between teaching styles for one-third of the competencies and no significant difference for the other two-thirds, the researcher asked: What are the implications for improving teaching? This is always a good question to ask. In this case, it could have been answered more completely. The researcher did leave the reader with some practical recommendations for preservice and inservice teacher education. However, not all of the recommendations are firmly based on data generated in this research.

In conclusion, I commend Leverne Barrett for his efforts to expand the body of knowledge about teaching effectiveness.

RELATIONSHIPS BETWEEN TEACHING PERFORMANCE AND THE SELECTED VARIABLES OF TEACHING LONGEVITY AND PERFORMANCE ON REQUIRED TEACHER CERTIFICATION EXAMINATIONS

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INTRODUCTION

The teacher represents the primary factor which will determine if learning will occur in any classroom. Educators generally accept the fact that effective teaching involves careful planning, effective executive of instructional presentations, and proper management of the educational environment. However, many policy makers have determined that effective teachers can be selected by the use of teacher certification examinations. In a study by the American Association of College of Teacher Education (1986), it was reported that half of the states now require testing at some point prior to certification, and two-thirds of the states have mandated increased standards for schools, colleges, and departments of education. Both the American Federation of Teachers and National Education Association have called for tougher standards for the preparation of teachers. The National Council for the Accreditation of Teacher Education in its redesign of accreditation standards, in effect, raised admission standards into teacher education, called for a significant change in the program content, and emphasized an increased reliance on the knowledge base for teacher education (Smith, 1986).

External examinations as predictors of competence have been increasingly adopted over the past decade. The National Teacher Examinations have been used to assess the knowledge of teachers and prospective teachers since 1940, when the examinations were first administrated by the American Council on Education (Brown, 1974). In 1982 at least 19 states were requiring prospective teachers to take the National Teacher Examination for certification purposes in an attempt to improve the quality of teachers entering the profession (Tarver, 1983).

The 1985 North Carolina General Assembly directed the Board of Governors of the University of North Carolina to establish a Task Force on the Preparation of Teachers and to report the findings and recommendations of its study to the 1987 Session of the General Assembly. As a part of the charge to the Task Force, the legislature directed the Board of Governors to study ways of improving efficiencies in the administration of teacher education programs and ways of upgrading teacher preparation programs to make the course of study more rigorous and more effective (The Board of Governors of The University of North Carolina, 1986).

The Task Force stated that it felt stronger standards, conscientiously applied, and not longer periods of study, offered the most promising solutions to the problem of making necessary reforms in teacher education programs. Based on these propositions, the Task Force recommendations called for a significant strengthening of teacher preparation programs by increasing score requirements on Core Batteries I and II of the National Teacher Examination to the 35th percentile as prerequisites for entering teacher education programs (The Board of Governors of The University of North Carolina, 1986). Since these recommendations have been made to and accepted by the North Carolina General Assembly, the North Carolina Board of Education adopted a plan to increase the minimally acceptable score for "Core Battery I - Communications Skill" from 636 to 641 and to increase the minimally acceptable score for "Core Battery II - General Knowledge" from 631 to 641 as of July 1, 1991.

However, neither the Task Force nor the State Board of Education have made any recommendations or taken action to raise the minimally acceptable score on the "Core Battery III - Professional Knowledge" portion of the National Teacher Examinations. Since the "Professional Knowledge" portion of the National Teacher Examinations is the examination score required for obtaining a teaching certificate in North Carolina, a need exists to determine if a positive relationship exists between performance on this examination and teaching performance. If a positive relationship is found to exist between performance on "Professional Knowledge" examination and teaching performance, consideration should also be given to increasing the minimally acceptable score for this portion of the National Teacher Examinations as a way of increasing the quality of potential teachers entering the teaching profession.

Years of teaching experience or longevity in the profession is another demographic characteristic that is often cited as being associated with effective teaching performance. However, Purser (1987) conducted a study in Mississippi in an urban school district with a student population of 30,000 and a certified staff of 1,700 employees and found that there was no statistical relationship between teacher effectiveness and years of teaching experience (longevity).

The North Carolina Task Force on the Preparation of Teachers (The Board of Governors of The University of North Carolina, 1986) also reported that something needed to be done to both attract more qualified individuals into the teaching profession and to retain those who elect to enter it. The Task Force indicated that it agreed with the premise that a dramatic improvement in teachers' salaries was a central requirement for retaining teachers in North Carolina and the members of the Task Force indicated that they believed that any plan devised to effect improvement in teachers' salaries must have three features. First, there needs to be a significant increase in the starting salary for beginning teachers that is more competitive with other professions. Second, the salary structure must be designed to encourage retention in the first five or six years and to reward careers in teaching at salary levels competitive with middle management and professional positions outside the teaching profession. Third, there must be a long-term plan to improve the entire salary structure for teachers in the State and to reward career teachers in the profession (The Board of Governors of The University of North Carolina, 1986). Since the recommendation to improve salary as a means to retain good teachers is tied solely to years of teaching experience, rather than developing a merit schedule to reward effective teaching, a need exists to determine if there is a positive relationship between years of teaching experience or longevity and teaching performance.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the relationship between teaching performance of vocational education teachers in North Carolina and the demographic variables of teaching longevity, as measured by years of teaching experience, and performance on the National Teacher Examinations. More specifically, the research objectives of this study, stated as research questions, were as follows:

1. To what extent does years of teaching experience (longevity) relate to teaching performance of North Carolina vocational education teachers when using the State adopted teacher performance appraisal instrument for assessing on-the-job teaching performance?

2. To what extent does performance on the National Teacher Examinations relate to teaching performance of North Carolina vocational education teachers when using the State adopted teacher performance appraisal instrument for assessing on-the-job teaching performance?

PROCEDURES

The population for this study consisted of all middle and high school vocational education teachers in 16 of the 18 local school systems in the Central Education Region (Region III) of North Carolina during the 1987-88 academic year (N = 843). Two superintendents in Region III failed to give consent for their school systems to be involved in the study and thus, the teachers within those two systems were not included in the research population. A list of vocational education teachers was provided by the vocational education director in each of the participating school systems and was used to provide the frame for the study.

According to Krejcie and Morgan (1970), a sample size of 269 was needed to represent the population of 843. However, since the typical return rate for questionnaires sent to education administrators, based on previous North Carolina studies, has been approximately 60%, oversampling was determined to be necessary to meet the sampling requirements. Based on the considerations related to the suggested sample size, traditional return rates , and the need for oversampling as discussed by Hinkle, Oliver, and Hinkle (1985), a decision was made to increase the research sample to approximately 450 teachers. Seven of the 16 school systems in the research population were selected to have their vocational education teachers be involved in the study by drawing a stratified random sample of school systems based on student population, geographic location, and education level (middle school versus high school). The research sample ($\underline{n}$ = 443), which represented over 52% of the population, was composed of the vocational education teachers employed in the seven selected school systems.

The teacher performance appraisal instrument which was developed and adopted by the North Carolina Department of Public Instruction as a component of the Effective Teacher Training Program was slightly modified and used to collect the research data from principals regarding teaching performance of the teachers. Content validity of the modified instrument was determined by the use of a panel of experts and the instrument was pilot-tested for clarity and readability. Reliability coefficients calculated to determine the internal consistency of the instrument for the eight major instructional functions on the instrument ranged from .64 to .91, and overall reliability rating for the instrument was .84. Data regarding years of teaching experience and performance on the National Teacher Examinations were obtained from the Division of Standards and Certification, within the North Carolina Department of Public Instruction, for the teachers involved in the study.

The teachers in the sample were sent forms to be completed and returned which gave their principals permission to release their completed evaluations of the teaching performance for research purposes. A follow-up mailing was sent to the teachers who had not returned their consent forms approximately six weeks after they were initially distributed. A total of 243 teachers returned their completed consent forms.

Teaching performance data were collected near the end of the 1987-88 academic year for the 243 teachers who completed and returned their consent forms, allowing their principals to release their evaluations . The teacher performance appraisal instruments which were to be completed for each vocational teacher were distributed to the principals along with consent forms, signed by the teachers. Principals completed and returned evaluation instruments for 152 of the vocational education teachers following the initial distribution. Principals who had not returned their completed evaluations within four weeks of the initial distribution were sent a follow-up letter requesting their participation in the study. This procedure yielded completed evaluation instruments for 24 additional teachers. According to Miller and Smith (1983), late respondents have been found to be very similar to nonrespondents. Based on this finding, data from late respondents (those who responded after receiving the follow-up letter) were statistically compared to data from early respondents. Since t-tests indicated no significant differences between early and late respondents, the data sample was assumed to be representative of the population of principals, and the data from early and late respondents were combined for research purposes.

Analysis of the data was computed for the 176 vocational teachers for which principal completed assessment instruments were available. Descriptive statistics such as frequencies, percentages, and means were used to describe the data. StatView 512+ computer software was used for calculating correlation coefficients. An alpha level of .05 was set a priori for the study.

RESULTS/FINDINGS

The teacher performance appraisal instrument which was developed and adopted by the North Carolina Department of Public Instruction was slightly modified and used as the data collection instrument for this study. Utilizing the instrument, principals were asked to evaluate the performance of their teachers. The instrument was designed to be used for measuring teacher performance for 38 instructional practices which were identified in the literature as being associated with effective teacher performance (Hyde, 1985). The instructional practices were categorized into eight major instructional functions (See Table 1). Respondents used a six point scale for rating teacher performance for each of the 38 instructional practices as well as for each of the eight major instructional functions. The rating scale was: (1) unsatisfactory; (2) below standard; (3) at standard; (4) above standard; (5) well above standard; and (6) superior. Principals, on the average, assessed the performance of their vocational education teachers as being above standard in all eight instructional functions, and their mean scores are presented in Table 1.

The teachers making up the research sample had an average of 14.55 years of teaching experience, ranging from a minimum of zero to a maximum of 40 years. The statistical relationships between teacher performance on the eight instructional functions and years of teaching experience were examined using Pearson Product Moment Correlation Coefficients. As reported in Table 1, no statistically significant relations existed between the variables.

Table 1

Vocational Education Teacher Performance by Major Instructional Function as Determined by Principal Evaluations and Correlational Coefficients For Years of Experience and Performance on the "Weighted Commons" and "Professional Knowledge" Portions of the National Teacher Examinations

Major instructional functions	Principal Evaluations M^a	Years Experience r^b	NTE Weighted Commons r^c	NTE Professional Knowledge r^d
Management of instructional time	4.69	-.124	.096	.020
Management of student behavior	4.57	-.137	.115	-.013
Instructional presentation	4.64	-.084	.093	-.030
Instructional monitoring of student performance	4.69	-.148	.052	-.021
Instructional feedback	4.54	-.089	.126	-.023
Facilitating instruction	4.54	.070	.140	.033
Communication within the educational environment	4.90	.077	.054	-.052
Performing non-instructional duties	4.71	-.053	-.148	-.025

Note. Means were calculated using a scale where: 1 = Unsatisfactory; 2 = Below Standard; 3 = At Standard; 4 = Above Standard; 5 = Well Above Standard; and 6 = Superior.

$^a n = 176$.

$^b n = 176$.

$^c n = 92$.

$^d n = 21$.

$^* p < .05$.

Due to the fact that the National Teacher Examinations only became a requirement for obtaining a teaching certificate in North Carolina in 1964, sixty three of the teachers had not completed the National Teacher Examinations. Of the teachers who had completed the examinations, 92 had completed the "Weighted Commons" version of the examination, which was required for certification between January 9, 1964 and June 30, 1983. The minimum acceptable scores for the "Weighted Commons" ranged from 450 in 1964 to 492 in 1983. The mean score obtained from the research sample who completed the "Weighted Commons" examination was 561.58. The remaining 21 teachers in the research sample completed the "Core Battery III - Professional Knowledge" portion of the National Teachers Examination. Core Battery III became a requirement for certification on July 1, 1983, and 644 was established as the minimum acceptable score. The mean score for this portion of the National Teacher Examinations for the teachers in the research sample was 660.05. The statistical relationships between teacher performance on the eight instructional functions and performance on both the "Weighted Commons" and the "Core Battery III - Professional Knowledge" portion of the National Teachers Examination were examined using Pearson Product Moment Correlation Coefficients. As reported in Table 1, no statistically significant relations existed between these variables.

CONCLUSIONS AND/OR RECOMMENDATIONS

Principals in the Central Region of North Carolina generally perceived that the performance of their vocational education teachers was "above standard" in the eight major instructional functions measured by the State adopted teacher performance appraisal system. This indicated that the principals perceived some of the 38 teaching experiences incorporated within the eight major instructional functions identified in the assessment instrument were being demonstrated at a high level while the others were being demonstrated at a consistently adequate/ acceptable level. However, a better channel of communication needs to be established between vocational education teachers and their principals regarding what is expected for each major instructional function. Principals could help their teachers strive for improvement by relating to the teachers in precise terms what they perceive as being "well above standard" or "superior" teaching performance for each of the eight major instructional functions measured by the State adopted teacher performance appraisal instrument.

Since the findings of this study indicated that length of teaching experience was not related to effective teaching, performance as an instructor should not be expected to improve with only additional years of teaching. Therefore, legislators and educational leaders should give consideration to developing a merit pay system designed to reward teachers for effective performance rather than longevity in the profession.

There are no statistical relationships between teaching performance as assessed by principals using the State adopted teacher performance appraisal instrument and performance on the various portions of the National Teacher Examinations. Policy makers and educational leaders should not equate performance of individuals on the various portions of the National Teacher Examinations with potential performance of the individuals to become effective teachers. Therefore, there is no evidence that raising the minimum required score for the "Core Battery III - Professional Knowledge" portion of the National Teachers Examination will result in the identification or selection of higher quality teachers.

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RELATIONSHIPS BETWEEN TEACHING PERFORMANCE AND THE SELECTED VARIABLES OF TEACHING LONGEVITY AND PERFORMANCE ON REQUIRED TEACHER CERTIFICATION EXAMINATIONS

A Critique

David L. Williams, Iowa State University --Discussant

The teacher is the key to quality education. Teacher organizations, accrediting associations, and state governments are supporting higher standards for teacher certification. Thus, research to identify predictors of teacher competence continues. Equally important to the initial measure of teacher competence is the assessment of on-the-job teaching performance. This study based in North Carolina addressed both of these issues.

The paper provided a brief theoretical framework for the investigation and adequately described the research procedures employed. The objectives were carefully stated as research questions. Variables to be studied were named in the research questions. The population for the study was concisely described and proper sampling techniques were utilized. The researcher oversampled in a plan to get a desired sample size; however, the sample goal of 269 was not reached due to layers of approval needed in the data collection process. Thus, one could ask if the sample (152) is representative of the population. A greater level of oversampling may be needed when data collection involves multiple approvals.

The researcher is to be commended for utilizing existing data and for following correct procedures in securing confidential information. Utilization of state adopted instruments, such as the teacher performance appraisal instrument used in this research, helps to tie research to practice and practice to research. The researcher took appropriate steps to validate the measurements and to test reliability of the instrument. Dynamic changes in education demands that we collect, analyze and report research data as quickly as possible. The data reported in this study is already three or four years old.

Granted the research was designed as a correlational study, the researcher could have made better use of descriptive statistics to more completely describe the sample of teachers. In some cases the most valuable part of observational research is a complete description of the respondents

The finding of no significant relationship between teacher performance as rated by principals and scores on the National Teachers Examination raises several questions, including: (1) What is being measured by the two instruments? and (2) Is there a gap between theory (National Teachers Examination) and practice (performance of teachers)?

The lack of significant relationship between length of teaching experience and teaching performance was another finding that raises several questions, including: (1) Have other studies reached similar conclusions? and (2) What can be done to help people become more effective teachers?

I want to conclude by commending Larry Jewell for sharing his research with this group. His work makes a contribution to the body of knowledge.

CHANGING TEACHING EFFECTIVENESS BEHAVIORS THROUGH IN-SERVICE

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INTRODUCTION/THEORETICAL FRAMEWORK

The issues of determining who are effective teachers and how does one become an effective teacher are complex. Effective teaching is certainly more than imparting knowledge of subject matter. Davies (1981) believes that teaching is a combination of efficiency and effectiveness. Brophy and Good (1976) found that proactive teachers are more effective than reactive teachers and Claxton and Murrell (1987) state that teachers who understand learning styles and individual needs are more effective.

In a study conducted by the Stanford Center For Research and Development in Teaching (SCRNT), researchers Clark, Snow, Shovelson (1976) conducted three experiments on learning to teach. They found that few teachers showed marked increases in student learning with practice. Practice, by itself, did not enable teachers to increase student achievement.

If practice is not the answer then the question remains: How does one become a more effective teacher? Jones and Lowe (1990) and Tibbett (1990) maintain that staff development is essential in assisting teachers to become more effective. Medley, Coker and Soar (1984) proposed that classroom observations over a period of time are needed to diagnose areas of weakness, to implement a strategy for improvement, and to create a system of support and feedback. Brophy and Good (1976) concur; however, they state that in addition to classroom observations, feedback from student ratings can improve teaching effectiveness. The Stanford Group concludes that teachers might profit from a process that would enable them to more systematically observe the effects of their teaching on students. They recommend a training program that would help teachers become researchers on their own teaching effectiveness. They maintain that improvements in teaching effectiveness will be achieved only after teachers themselves learn to define and solve instructional problems in terms of the uniqueness of the complex teaching situations they face alone.

Another way in which teachers can become more effective is through in-service and staff development programs. Erikson and Rose (1976) found that in-service educational opportunities can promote growth and change. There are a variety of types of in-service programs. The short-term in-service is a one-shot program involving workshops and seminars which concentrate on a particular topic. This kind of program is most appropriate when the purpose is to develop an awareness of new concepts or to serve a large number of individuals in a short period of time.

A second major kind of in-service involves a long range, concentrated effort often within an organization like a school district. It may be planned over a long period of time (several weeks to a year or more). The goal is to cause a change in behavior of individuals within the organization.

A third type of in-service education as described by Tibbetts (1990) maintains that individually designed staff development programs are essential for serving the diverse needs of teachers. Tibbetts wrote that it can be difficult to get teachers to change ingrained patterns of teaching. while people can readily accept change in things, it is a slow process to accept change in personal behavior and patterns. Tibbetts asserts that educators recommend individualization for students but ignore the individual staff development needs of teachers. He avowed that we KNOW better than we DO and concludes that effective staff development appears to require a continuous sequence of theory and research, demonstration of content and techniques, practice with structured feedback, peer coaching and evaluation of results. Tibbetts believes that anything short of this will result in fragmented learning without effective transfer.

PURPOSE AND PROBLEM STATEMENT

In the last fifteen years, many studies have been done to define teaching behaviors or competencies that could be identified with student learning. However, little research in vocational education has been conducted on how to increase a teachers effectiveness in semi-controlled field settings. The problem this study addressed was that the profession of Agriculture Education does not have sufficient information to develop intervention programs to improve teaching effectiveness.

OBJECTIVES

1. Determine the difference in teaching effectiveness between experimental and control groups of teachers.
2. Analyze the impact of a 3 year in-service program on teaching effectiveness.

METHODS AND/OR PROCEDURES

Population/Sample. The population for the study was those secondary teachers in high schools offering vocational agriculture and other vocational subjects within 150 miles of a mid-western city. Seven schools were randomly selected to participate. A three tier design was employed. Two schools were selected as the experimental schools; three schools were designated for the medium treatment control group and two schools for the minimum treatment control group.

Instrumentation. Three instruments were used throughout the project. Teaching/learning styles were identified using the Myers-Briggs Type Indicator (MBTI), Form G (Myers, McCulley 1985). This is a widely used psychological instrument that has identifiable teaching and learning styles (Golay, 1982; Kiersey, 1978; Lawrence, 1982; Myers, 1985; Silver, 1981; McCaulley, 1976, 1974). The MBTI has eight sub-scales which have a reliability of.80. Both teachers and students completed this instrument.

The second instrument used was the Classroom Environment Inventory (CEI), developed by Stern (1979). The CEI has been normed and contains 300 questions divided into 30 sub-scales with a reliability coefficient of.64. The CEI is designed to measure the psychological environment of the classroom as perceived by students. For comparisons, both teachers and students completed this instrument.

The instrument used to collect teaching effectiveness data was the Classroom Observation Keyed for Effectiveness Research, COKER, (Coker, Coker, 1984). The COKER is a low-inference sign instrument used by trained observers to code teacher and student activities. This instrument has evolved out of five other observational instruments whose validity and reliability were established over many years: OSCAR 5V)Medley, 1973); STARS (Spaulding, 1976); FLACCS (Soar,

Soar, and Ragosta, 1971); TPOR (Brown, 1970), and CASES (Spaulding, 1976). The COKER, or any observation schedule will not measure effectiveness directly. Rather, it will measure the degree to which a teacher demonstrates behaviors known or believed to characterize effective teachers, as has been shown in process product research (COKER, COKER 1984).

Design. Teachers were divided into 3 groups: full treatment group X (N=21), medium treatment control group A (N=25), and minimum treatment control group B (N=37).

Treatment. The full treatment group X teachers received 1-2 days of in-service each year, over a period of 3 years, followed with one short teachers' meeting each semester to discuss progress (Table 1). Each teacher in group X received instruction in using teaching/learning styles, student classroom climate feedback data and teaching effectiveness scores. For the Teaching and Learning styles segment of the in-service, experimental teachers were given a 4 hour feedback session on their personal teaching style as measured by the MBTI. In another 4 hour session, the experimental teachers learned various teaching strategies to apply with students' differing learning styles. During year 2 the experimental teachers received the feedback from their students from the CEI instrument and a profile of their teaching effectiveness via the COKER. Given this diagnostic information, experimental teachers were assisted through in-service, to develop strategies that would improve their scores.

Medium treatment group A teachers received the same in-service program however, all feedback data from students or teaching effectiveness scores was delayed 6 months. While the minimum treatment control group B teachers received instruction only on use of teaching and learning styles and student feedback data was delayed for one year. Teaching effectiveness scores were not provided until the end of the third year. (see table 1 for more detail).

Data collection. A minimum of 20 observations per year per teacher for each group was collected by trained observers over the 3 year period using the COKER.

Table 1

Summary of Treatment Procedures

	Group X			Group A			Group B		
Treatment	Yr 1	Yr 2	Yr 3	Yr 1	Yr 2	Yr 3	Yr 1	Yr 2	Yr 3
Inservice Hrs	9	9	5	7	4	4	0	4	0
Student Learning Styles Provided With Feedback	yes	yes	yes	no	*yes	*yes	no	no	*yes
COKER Observation Feedback	no	yes	yes	no	*yes	yes	no	no	*yes
Classroom Enviromental Feedback	no	yes	yes	no	*yes	*yes	no	no	*yes

* Delayed information

RESULTS/DISCUSSIONS

The COKER instrument yielded scores on 24 teaching effectiveness competencies. There were significant differences (p<.05) between teacher treatment groups for 14 competencies (Table 2). Of those 14 competencies, the full treatment group X teachers scored significantly higher then group A or B on 11 competencies. The medium treatment group A teachers scored significantly higher than groups X and B on 3 competencies. The minimum treatment group B teachers did not score higher than groups X or A on any competency.

Each teaching effectiveness competency is discussed in the order as presented in Table 2. For competency 1, demonstrates enthusiasm, there were no significant differences between groups, even though the experimental Group X had a higher score. The importance of enthusiasm was strongly emphasized with the experimental group.

Competency 2, provides learning experiences for use outside school, the Experimental Group X scored significantly higher than Control Group B (p<.05). Teachers in group X learned about the importance of making lessons relevant to the real world based on student learning style.

For competency 3, provides opportunities for successful experience, there were no significant differences, even though Group X was made aware of its importance. This finding of no difference may be due in part to the espoused vocational philosophies of teachers in all three groups who believed that learning by doing is very important.

There were significant differences between Groups for competency 4, demonstrates proper listening skill. Group X was higher than Group B (p<.05). This difference may be due to Group Xs' heightened awareness of the importance of student differences and their effort to reduce teacher talk.

Competency 5, maintains an action learning environment, significant differences were found in favor of Group X. Group X was higher than both Groups A and B (p<.05). The importance of competency 5 was strongly emphasized with Group X in workshops and teacher meetings, especially for the high number of active learners identified in their classes.

Group X scored significantly higher than group B on competency 6, encourages students to ask questions (p<.05). Group X teachers seemed to be more successful in applying the principles of creating a positive learning environment in which students could ask questions.

Teachers in Group X were more successful in applying competency 7, provides positive feedback, than Group A and B (p<.05). Here the experimental Group X teachers seemed to have more successfully applied their knowledge of the impact of positive feedback. This finding may be due in part to the feedback information they received through the COKER instrument.

Although competency 8, demonstrates problem solving skill was not an emphasis with Group X, they scored significantly higher than Group B (p<.05). An explanation for this difference is not clear.

For the next three competencies: 9, clear directions; 10, effective classroom management; and 11, provides a clear description of tasks, teachers in Group A scored higher (p<.05) than the other two groups. These competencies were not emphasized in any group, therefore these differences may be attributed to personality differences of Group A teachers. A high percentage of Group A teachers was identified as thinking judging personality types, as revealed in another analysis of data not presented in this report. This style of teacher often places a high priority on these competencies.

Table 2

COKER Teaching Effectiveness
Competency Mean Scores By Treatment Group Over
Three Years

Coker Teaching Effectiveness Competency	Full Treatment Experimental Group X N=21	Medium Treatment Control Group A N=25	Minimum Treatment Control Group B N=37
1. Demonstrates Enthusiasm for Teaching	53.2	51.0	49.0
2. Provides Learning Experiences and Principles for Use Outside School	55.4a*	51.0	49.1b
3. Provides Opportunities for Successful Experiences	52.2	51.0	49.4
4. Demonstrates Proper Listening Skills	54.1a	51.4	48.5b
5. Maintains an Active Learning Environment	55.2a	49.6b	48.2b
6. Encourages Students to Ask Questions	56.1a	51.0	47.5b
7. Provides Positive Feedback on Performance	56.4a	51.0b	47.1b
8. Develops and Demonstrates Problem Solving Skills	55.1a	52.0	49.1b
9. Gives Clear Directions and Explanations	49.1b	54.4a	49.3
10. Implements an Effective Classroom Management System for Positive Behavior	49.0	54.1a	47.2b
11. Provides a Clear Description of the Learning Task and Its Content	50.0	55.1a	48.0b
12. Uses a Variety of Instructional Strategies	54.0a	52.5	48.1b
13. Demonstrates Patience, Empathy and Understanding	53.0	51.0	49.1
14. Monitors Learner, Understanding and Reteaches	53.1	51.4	49.2
15. Helps Students Recognize Progress and Achievements	55.2a	51.4	47.1b
16. Provides Learners Practice and Review	56.1a	51.1	47.2b
17. Demonstrates Ability to Work With Individuals, Small or Large Groups	53.2a	52.1	48.1b
18. Assists Students in Discovering and Correcting Errors and Inaccuracies	53.0	52.3	48.4
19. Teacher Stimulates Student Interest	50.1	49.1	52.1
20. Provides Examples of How Task is to be Completed	53.4	53.0	49.1
21. Uses a Variety of Resources and Materials	52.1	50.1	48.4
22. Uses a Variety of Cognitive Levels in Strategies of Questioning	54.1	51.0	49.2
23. Allows for Individual Difference in Evaluation	52.0	50.2	49.1
24. Uses Convergent and Divergent Inquiry Strategies	54.3a	52.1	48.1b

*Note: Letter "a" is significantly greater than letter "b" (p<.05) by Fisher's LSD Test

Competency 12, *uses a variety of strategies* was emphasized in workshops with Group X and they did score higher than Group B (p<.05). Teachers in Group X may have scored higher because of their recognition that students with differing learning styles need to be afforded a variety in teaching strategies to maximize learning.

There were no significant differences between groups for competency 13, *demonstrates patience and empathy,* and competency 14, *monitors learner understanding*. Group X teachers' understanding of learning styles did not make a measurable difference in exhibiting patience. This may be due in part to the probability that all vocational teachers at times must learn to cope with difficult students.

Although teachers in Group X did not receive much instruction for competency 15, 16 and 17, *helps students recognize progress, provides practice and review,* and *demonstrates ability to work with individuals and small groups,* they did score higher than Group B (p<.05). Group X teachers may have recognized the need to improve from their feedback from COKER scores for these three competencies.

There were no significant differences between groups for competency 18, *assists students in correction errors.* There was no specific instruction provided to any group in this area.

There were no significant differences for competencies 19-23 even though Group X had specific instruction in competencies 19, *stimulating student interest* and 22, *uses a variety of cognitive levels in questioning.* Why there were no significant differences is unknown.

The last competency to be tested was 24, *uses convergent and divergent inquiry strategies.* Group X was higher than Group B (p<.05). Since this was not an emphasis of any workshop for Group X, the difference may be due to recognition for need for improvement as a result of feedback from COKER observation reports.

In sum, results seem to indicate that the in-service programs that the experimental Group X of teachers received was effective in helping them achieve higher teaching effectiveness scores. In most instances, data in Table 2 indicate that the limited in-service training Group A received helped them to achieve average scores between Groups X and Group B. Group B teachers who received little or no in-service in time to affect their scores, consistently scored below the other two groups, except for competency 19.

CONCLUSIONS

Several conclusions can be drawn from this study that could be applied to the practice of teacher improvement. First, in-service programs that have a sound theoretical base of substance and can be understood and applied by teachers, seemed to help teachers be more effective. Three areas of in-service training that helped the experimental teachers be more effective were their knowledge and application of teaching and learning styles, classroom environments and teaching effectiveness competencies. Teacher identification of needs based on observational and student data and then developing a plan to improve, had a significant effect on the experimental group of teachers.

At the end of year one, the experimental Group X teachers were very enthusiastic about their success in applying the principles learned from teaching and learning styles theories. This enthusiasm was exhibited in the teacher meetings in the kinds of in-depth questions asked as to how to solve problems, and their self-report of efforts to explain their classroom "success" to colleagues not in the program. Immediate supervisors frequently commented about the enthusiasm observed in the experimental teachers.

By the second year, teachers in the experimental Group X were beginning to grasp the importance of what they had learned because they had a year of application experience as well as observational data from the COKER and CEI instruments. Teachers in the experimental Group X were beginning to practice what Valverde (1982) defined as reflective teaching, where an individual asks value-laden questions and responds to memory and then concludes whether they are satisfied or dissatisfied with their teaching. They were also responding in ways that Brophy (1976) observed, that is, teachers who act in self-defeating ways without awareness, will change their behavior quickly if the problem is called to their attention.

The three year duration of the in-service program had a positive effect on change of teacher behavior. Other studies on in-service education found similar results. Borg (1972), and Little, et.al. (1987) found a relationship between duration of in-service and teacher classroom effectiveness.

A final caveat is needed. Conducting field research to improve teaching effectiveness is at times frustrating, especially when teachers change schools or administrative leadership is lacking. Much patience is needed in trying to affect change because teachers are faced with many agendas other than the improvement of their teaching. Lastly, being part of a program of teacher improvement where the researcher can get immediate feedback on treatment is certainly worth the effort, and is considered to be essential by Hall and Loucks (1977).

RECOMMENDATIONS

1. In-service education programs that are designed to improve a teachers effectiveness behavior, should be conducted over a period of years.
2. Hold small group meetings of teachers in training to report progress and receive feedback on self-targeted effectiveness content areas.
3. Frequently collect observational data and give results to teachers.
4. Teach teachers how to observe each other and give feedback.
5. Provide teachers the opportunity to learn about their teaching style and student learning styles.
6. Teachers should be taught how to improve teaching effectiveness competencies, that they agree are in need of improvement.
7. Provide an opportunity for teachers to learn how to create positive classroom environments.

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CHANGING TEACHING EFFECTIVENESS BEHAVIORS

A Critique

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What is effective teaching? How can people become more effective teachers? These are common questions in many circles today. There is evidence that practice, by itself, does not make perfect in regard to teaching. However, there is evidence that teachers can become more effective through systematic inservice and staff development programs. The author of this research paper provides a brief theoretical framework for his investigation. The literature he cited grouped inservice into three kinds: (1) short-term, (2) long-term, and (3) individualized.

The researcher clearly stated a problem facing the Agricultural Education profession: there is not sufficient information to develop intervening teacher inservice programs to improve teaching effectiveness. He then designed a field-based experiment to study the problem. The investigation appears to be carefully planned following sound research procedures. However, it would have been helpful to the reader if the objectives had been more specific. I also would encourage the researcher to report the hypothesis tested in the experiment.

This paper reports only a portion of the findings of a three-year experiment. However, more attention needs to be given to describing the variables and measurements that were the focus of this paper. For example, reliability data for the Myers-Briggs Type Indicator and the Classroom Environmental Inventory were reported, but the reliability for the Classroom Observation Keyed for Effectiveness Research (COKER) was not reported. Granted the results of the other two instruments were used in the treatment, it would have also been helpful if a short statement was included on statistical tools used to analyze the data.

The researcher reported and analyzed data by twenty-four teaching effectiveness competency. Such is desirable for individual diagnosis of teacher behaviors. But, a composite measure of teacher effectiveness would also be useful and perhaps appropriate for the experiment. Is the COKER constructed to yield a composite measure of teaching effectiveness?

The researcher is to be commended for relating his findings to theory. The body of knowledge supporting long-term (3 years or longer), carefully planned inservice to improve teacher classroom effectiveness is growing. The author concludes the paper with a list of recommendations to improve teaching effectiveness through inservice education.

In conclusion, I want to commend Leverne Barrett for his pragmatic efforts to conduct field-based research on changing teacher effectiveness behaviors.

A COUNSELING TOOL FOR CAREERS IN AGRICULTURE

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INTRODUCTION

Agriculture today is very different from the agriculture that was prevalent during the early years of federal support for vocational agriculture. It is also different from the agriculture that was prevalent when Walker initially developed the "Vocational Agriculture Interest Inventory for Guidance of Eighth Grade Students" in 1962 and revised it in 1971. Substantial changes have occurred in both the agricultural sector and in formal school agricultural education programs. The technology of agricultural science has increased exponentially. Recently, the curriculum content of secondary school agriculture programs has changed with an increasing emphasis on agribusiness and science related content. Currently, approximately 20 percent of all occupations are classified as "agriculture related." However, only about 2 percent are directly related to production agriculture (Case, 1990). Yet, many students view agricultural education as being oriented toward production agriculture (Scanlon et al., 1989).

Agricultural education needs to show that it serves the total agricultural industry and that this is an exciting time to be involved in agriculture. Coulter et al. (1986) implied that this could be accomplished by having public relations efforts emphasize the manifold scientific opportunities in agriculture. Agriculture plays an integral role in advancing the frontiers of science and technology related to areas such as: (1) genetic engineering to improve livestock and crops; (2) tissue culture to expedite plant variety development and propagation; and (3) to the development of more convenient, economical foods with nutrient composition responsive to current research into diet and health relationships. Modern agriculture is inseparable from the world of insurance, credit, stocks and commodities, real estate, tax law, and monetary policy.

Agricultural education no longer deals solely with production agriculture but encompasses the production, processing, distribution, and marketing of food, feed, and fiber and the management of our natural resources on the interdependent local, national and international levels. As a result, there is an urgent need to develop a cadre of people who are capable of working in the different and emerging areas of agriculture.

PURPOSE AND OBJECTIVES

The overall purpose of this study was to revise the Applied Biological and Agribusiness Interest Inventory (Walker & Stevens, 1971) to reflect the current areas encompassed by agriculture in order to provide an up-to-date tool for use by local school counselors and teachers. The interest inventory was examined for its ability to differentiate among students who had differing levels of interest in agriculture. Three objectives were identified as pertinent to the study:

1. Identify items that represent and are differentiated into the seven agricultural areas (production agriculture; agricultural mechanics; horticulture; agricultural products, processing

and marketing; agricultural supplies/services; renewable natural resources; and forestry) (Appendix) .

2. Conduct validity and reliability assessments of the interest inventory. Specifically, the assessments completed included: (a) content and face validity; and (b) internal consistency using Cronbach's Alpha.

3. Establish whether differences exist in interests (discriminating ability) between the norm group of 8th graders and a criterion group of 10th grade agriculture students.

4. Develop a scoring key that differentiates between high, medium and low agricultural interests of junior high and high school students.

PROCEDURES

The study was conducted using descriptive survey research procedures. Purposive sampling was used to insure geographic representation of students within the states being studied. This study was conducted with eighth grade and tenth grade students in school districts where four years of agricultural education was offered at the secondary school level. The schools were located in Pennsylvania, Virginia, and Iowa. In the final analysis, 12 Pennsylvania schools (1307 students), 9 Virginia schools (612 students) and 8 Iowa schools (291 students) participated in the study. This study was concerned primarily with the testing of interests of eighth grade students. Comparisons of eighth grade students' interests with those of tenth grade students in agriculture were made.

Tenth grade students (the criterion group) were rated successful in agriculture if they had completed at least one year of agricultural education and planned to continue in the program the following year. Agricultural teachers were asked to rank each tenth grade student according to criteria which helped to further differentiate more successful agriculture students from less successful agriculture students.

Statements were identified and tested representing the seven agricultural areas for inclusion in the interest inventory during stage I of this project resulting in the final product, the Agri-Science Interest Inventory. Content validity was maintained by having the statements for the seven agricultural areas written and reviewed by people knowledgeable in those areas making this a valid instrument.

The following basic assumptions pertaining to the study were accepted by the investigator. 1. That the students with experience in agricultural education provide an appropriate measure by which to classify student interest in agriculture. 2. That the responses of tenth grade agricultural students rated successful by their agriculture teachers provided a valid measure of agricultural interests. 3. That tenth grade agricultural students receiving passing grades in agriculture and planning to continue in agriculture for another year were valid measures of success in agricultural education. 4. That the statements utilized in the instrument were representative of the seven areas of agriculture.

The limitations of this study pertain primarily to identification of the sample. They were: 1. that the study involved only the states of Pennsylvania, Virginia and Iowa; and 2. that the identification of schools for inclusion in the study were identified by head teacher educators in the three states with the intent to identify representative schools. Another limitation is that representativeness was not obtained through the use of probability sampling approaches.

ANALYSIS OF DATA

Data were analyzed using the Statistical Package for the Social Sciences, Version 10(SPSSX). A combination of statistical techniques were used to analyze the data in this study. Descriptive statistics were used to describe characteristics of the students in the study while inferential statistics (t-test, analysis of variance, Kruskal-Wallis, and Mann-Whitney U) were used to test the hypothesis. The authors recognize that non-probability sampling procedures were used. The investigators attempted to identify schools with agriculture programs which were representative of the general population of schools offering agriculture. Therefore, the inferential statistics of 2-way ANOVA was used.

RESULTS

PROFILE OF STUDENTS

Descriptive statistics were used to describe characteristics of the students in the study. For the eighth grade students in the study, 58 percent were males, white (89.1 %), 13 years of age or younger (63.3 %), living in a rural area (52.2 %) but not necessarily on a farm, and did not plan to enroll in agriculture the next school year (62.4 %). For the tenth grade students, 82 percent were males, white (83.6 %), 15 years of age or older (91.3 %), living in a rural area (66.8%) with 31.6 percent of those currently or having lived on a farm, planning to enroll in agriculture the next school year (78.5%). Forty-two (42%) percent of the eighth and 40.3 percent of the tenth graders' parents had at least a high school or equivalent education. Eighty-seven percent of the eighth graders and 78.1 percent of the tenth graders earned As thru Cs in school, and 79.2 percent of the eighth and 60.6 percent of the tenth graders planned to go to college. A majority of both groups had neither been in scouts (56.9% & 63.1% respectively) nor 4-H (77.6% & 64.5% respectively). Eighty-five percent of the tenth graders were currently enrolled in FFA, which they joined voluntarily (78.9%) and considered FFA important (88.3%). Nearly 38 percent of the tenth graders currently enrolled had the FFA Greenhand degree and had been rated fairly successful or better by their agriculture teacher (90.3%). Nearly 79 percent of the tenth graders currently enrolled in agriculture planned to enroll in agriculture the next school year.

OBJECTIVE 1-DIFFERENTIATION INTO AGRICULTURAL AREAS

A factor analysis was used to differentiate the items into the seven categories. All of the statements loaded at the .3 level or higher. The statements were subsequently divided and/or combined to maintain seven categories based on initial statement groupings, review by the panel of experts and factor analysis results.

OBJECTIVE 2-VALIDITY AND RELIABILITY

Content validity was built into the revised interest inventory from the outset through the choice of appropriate statements for the seven agricultural areas which were written and reviewed by professionals from the seven areas. The statements were written as clearly as possible then tested and analyzed in stage I of the study to determine items for inclusion in the final interest inventory further contributing to face validity, thus resulting in a valid instrument.

The internal consistency or homogeneity of the interest inventory was computed using Cronbach's alpha coefficient. The result was an overall reliability of .97 with a range from .75 to .93 on the seven agricultural area subscales indicating reliability for the overall instrument and subscales.

OBJECTIVE 3-DISCRIMINATING ABILITY

This section dealt with testing the hypothesis : There is no significant difference between the responses of the criterion group (10th grade) and the norm group (8th grade) on the seven subscale scores of the Agri-Science Interest Inventory. A two-way ANOVA (Table 1) was used to test for interaction between states (Pennsylvania, Virginia and Iowa) and grade levels (8th & 10th) on the score for each of the seven subscales. A slight interaction between states for the production agriculture and horticulture subscales were found. While being statistically significant, the difference attributed to the variable, state, was relatively small for both scales. The results reveal significant differences in students' agricultural interests in agricultural mechanics and forestry for the main effect, state.

When checking for interaction using the tenth grade students rated successful by their agriculture teachers, Pennsylvania's successful tenth graders were found to have the highest means followed by eighth graders enrolling in agriculture in ninth grade. The results reveal significant differences in students' agricultural interest in agricultural mechanics, agricultural supplies and services and forestry for the main effect, state (Pennsylvania vs. Virginia vs. Iowa).

A one-way ANOVA checked for differences between the responses of the criterion group (tenth grade) and the norm group (eighth grade) on the seven subscale scores of the Agri-Science Interest Inventory. The null hypothesis was rejected. Students in the criterion group scored significantly higher than students in the norm group in general; however, the tenth grade agricultural education students exhibited scores similar to those eighth grade students planning to enroll in agricultural education next year. Results of the ANOVA and subsequent post hoc analysis utilizing the Scheffé test indicate tenth grade agricultural students scored significantly higher than eighth graders, not planning to enroll, on five of the subscales thus supporting the rejection of the null hypothesis. These five subscales included (1) horticulture, (2) agricultural products, processing and marketing, (3) agricultural supplies and services, (4) renewable natural resources, and (5) forestry.

Nonparametric tests (Mann-Whitney U and Kruskal-Wallis) were used with the two subscales (production agriculture and agricultural mechanics) which did not meet the assumptions of equal variance (homoscedasticity) for the ANOVA. The Kruskal-Wallis test indicated a significant effect for the production agriculture scale and for the agricultural mechanics scale.

Based on the results, the inventory was able to discriminate between tenth grade agricultural students and eighth graders not enrolling. It also discriminated between eighth graders enrolling and not enrolling in ninth grade agriculture.

OBJECTIVE 4- DEVELOPMENT OF SCORING KEY

Based on the findings of this study a scoring key was developed to measure whether students have a high, medium, or low interest in agriculture. The scoring key was based on the scores of tenth grade agricultural students who were judged successful and planned to enroll in agriculture the next school year. A computerized Apple^{R} Hypercard^{TM} interest inventory with the 100 items was developed. The Hypercard^{TM} version automatically scores student responses when they complete the set of 100 statements facilitating the scoring process. This makes the Agri-Science Interest Inventory available with three different scoring options: (1) recording responses to be scored by the student on a plain piece of paper or onto the scoring key for immediate results, (2) recording responses on a computer scan sheet to be sent away for analysis, and (3) recording responses with the computerized Hypercard^{TM} version which automatically scores student responses upon completion of the set of 100 statements.

RECOMMENDATIONS

Based on the findings and conclusions resulting from this study, the review of literature and related studies, the following recommendations were made.

1. The Agri-Science Interest Inventory should be used by guidance counselors in advising students about future career choices.
2. This interest inventory should be used in conjunction with each student's indication of career interest.

3. Current teachers of agriculture can use the responses to the interest inventory with the seven subscales to update and enhance existing programs in order to meet student interest and community needs.

This study was conducted to develop an interest inventory that would assist teachers of agriculture and guidance counselors to determine eighth grade students who should consider enrollment in agricultural education and, in addition, to predict eighth grade students who may be successful. The use of this inventory will enhance the ability of students and other people in the teaching and guidance fields to better interpret the interests of potential students. Counselors need to help students interpret their interest inventory results in conjunction with their expressed interests and abilities. The inclusion of a scoring key facilitates the use of this interest inventory by providing students the option for immediate feedback. Since the interests of students in agriculture seem to be the most common criterion used by teachers and counselors for selecting students who will enroll in agriculture, an instrument that can accurately assess those interests is important.

Using the model in Figure 1 (Dawis, Lofquist, & Weiss, 1968) and the results of the interest inventory, guidance counselors can develop a framework to guide students in career selection. This will assist the student in planning a career development program and may result in increased career awareness.

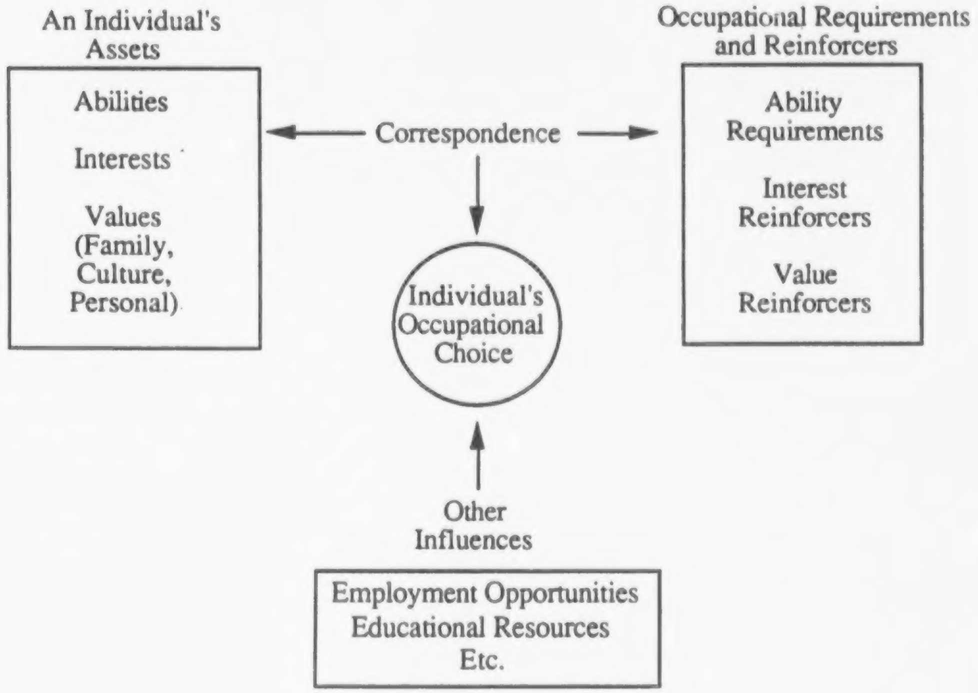
An Individual's Assets
Abilities
Interests
Values (Family, Culture, Personal)
Correspondence
Occupational Requirements and Reinforcers
Ability Requirements
Interest Reinforcers
Value Reinforcers
Individual's Occupational Choice
Other Influences
Employment Opportunities
Educational Resources
Etc.

Figure 1. The Occupational Choice Process

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Table 1. Summary of Two-Way ANOVA Results Examining the Influence of State Where School Was Located and Class Level on the Seven Subscale Scores.

Subscale and Group	N	Mean	S.D.	Significance Test Results at the .05 Alpha Level
Overall Interest Scores	1791	324	59	No interaction
10th grade in ag	542	350	54	Group <.05
8th grade planning to enroll	943	303	56	State >.05
8th grade not planning to enroll	306	346	48	
Production Agriculture (24)	1639	81	17	Significant
10th grade in ag	479	90	15	interaction
8th grade planning to enroll	874	74	17	between group
8th grade not planning to enroll	286	87	14	and state
Ag Mechanics (12)	1674	37	10	No interaction
10th grade in ag	503	41	9	Group <.05
8th grade planning to enroll	877	34	10	State <.05
8th grade not planning to enroll	294	43	8	
Horticulture (14)	1683	43	11	Significant
10th grade in ag	505	47	10	interaction
8th grade planning to enroll	885	40	11	between group
8th grade not planning to enroll	293	45	9	and state
Ag Supplies and Services (13)	1698	45	8	No interaction
10th grade in ag	512	47	7	Group <.05
8th grade planning to enroll	891	44	8	State <.05
8th grade not planning to enroll	295	45	7	
Renewable Natural Resources (15)	1636	49	11	No interaction
10th grade in ag	477	53	11	Group <.05
8th grade planning to enroll	868	46	11	State >.05
8th grade not planning to enroll	291	53	10	
Forestry (7)	1712	23	5	No interaction
10th grade in ag	521	25	5	Group <.05
8th grade planning to enroll	899	21	5	State <.05
8th grade not planning to enroll	292	25	4	
Ag Products, Processing & Marketing(15)	1641	49	9	No interaction
10th grade in ag	491	52	8	Group <.05
8th grade planning to enroll	867	47	8	State >.05
8th grade not planning to enroll	283	50	8	

NOTE: The interest inventory consisted of 100 items with a response scale of 1=strongly dislike, 2=dislike, 3=undecided, 4=like, and 5=strongly like. Therefore the overall interest score could theoretically range from 100-500. The subscales consisted of selected interest inventory items and the number of statements for each subscale is indicated in parentheses following the subscale title.

APPENDIX

SAMPLE STATEMENTS FROM THE AGRI-SCIENCE INTEREST INVENTORY

1. Look at livestock at a fair
2. Visit the zoo
3. Replace a broken window
4. Manage an area for wildlife
5. Cut logs into usable products
6. Cut up meat
7. Build a birdhouse
8. Learn how to conserve energy use
9. Change a sparkplug
10. Trim a hedge
11. Things that challenge you
12. Grow plants in water
13. Design displays or exhibits about agriculture
14. Work in a greenhouse
15. Watch a baby chick hatch from an egg
16. Learn about indoor tanks for raising fish
17. Learn about soil conservation
18. Learn about the environment
19. Talk with people
20. Restore polluted streams and rivers
21. Travel to another country
22. Determine the value of a forest
23. Protect lakes, streams and rivers from pollution
24. New and different experiences
25. Solve other peoples problems
26. Water plants
27. Draw plans for a building
28. Smell new cut hay
29. Learn how to make ice cream
30. Understand animal growth hormone effects
31. Manage fisheries, including streams, lakes and reservoirs
32. Build things from wood
33. Follow international events
34. Change a fuse
35. Develop a landscape plan with a computer
36. Operate farm equipment
37. Harvest fish
38. Repair something broken
39. Change a bicycle tire
40. Watch honeybees at work
41. Solve practical problems using math
42. Grow flowers
43. Raise small animals
44. Work with plants and trees
45. Study plant/animal cell structures
46. Help repair a lawn-mover engine
47. Arrange flowers
48. Wire an electrical plug
49. Measure fish growth
50. Milk cows

A COUNSELING TOOL FOR CAREERS IN AGRICULTURE

A Critique

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Contributions and Significants of the Research

The purpose of this study was to revise the Applied Biological and Agribusiness Interest Inventory (Walker & Stevens, 1971) to reflect the current areas encompassed by agriculture. This study has great potential for national significance because a counseling tool that can clearly differentiate among students with differing levels of interest in agriculture could positively impact the quality of information given to students by school counselors and ultimately encourage more students to explore careers in agriculture. The researchers are to be commended for clearly stating the objectives and connecting through the literature how agricultural careers have expanded during the past twenty years. However, the role of the counselor and the use of interest inventories was not included in the literature base. I propose that counselors may be playing a lesser role in students curricular interest decisions since the ratio of students to counselors have increased in many schools and it is difficult to provide individual attention.

Procedural Considerations

The study was conducted using descriptive survey research procedures. The authors clearly outlined the population studied and how the sample was obtained. Also, the assumptions and limitations of the study were well defined. Whether purposive sampling was needed to insure geographic representation of students is questionable. It appeared to me that random sampling would of provided geographic representation and assisted the researchers in being able to generalize results more broadly. Analysis of the data was explained and justification given for the use of inferential statistics. Results were well written and organized. The authors are to be commended for concisely summarizing the conclusions reached. Recommendations indicated that the AgriScience Interest Inventory was ready to use by guidance counselors and teachers. I would agree that this may be true for the schools studied, but recommend that further study be undertaken to examine carefully if issues of gender, ethnicity, and region of the United States has an impact on the interest inventories ability to differentiate.

Questions Raised

1. Are tenth grade students the most appropriate criterion group? It would be interesting to use twelfth grade agriculture students since they have had more time and study to consider their interest in agriculture.

2. Does the inventory discriminate between students' interest in agriculture or their interest in agriculture courses?

3. The sample studied was primarily white, male, and rural. If the sample was primarily female, urban and non-white would the results have been the same? Due to the changing demographics of many states, this question is in need of further study.

CAREERS IN AGRICULTURE AS PERCEIVED BY HIGH SCHOOL JUNIORS AND SENIORS

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INTRODUCTION

Agriculture is the backbone of today's work force in Idaho and across the nation. The image students have of the industry of agriculture and its career potential is critical to agriculture's future. Our students' career choice may influence the quality and quantity of the available agriculturists well into the next century.

Students usually equate a career in agriculture with farming or ranching only rather than with the science or business aspects of agriculture which leads to a pervasively negative opinion of pursuing a career in agriculture (Orthel, et al., 1989).

Other common misconceptions according to the Human Capital Shortages Task Force (1988) include:

1. Career opportunities are limited to production agriculture.
2. College of Agriculture degrees are lesser in quality and stature than degrees in business, engineering, biological and other hard sciences, and even the fine arts.
3. The current economic stress in agriculture translates into few professional opportunities in agriculture.
4. Salaries in agriculture are perceived as low.
5. Agricultural careers are considered second rate by faculty and others in higher eduction.
6. The high school vocational agriculture track reinforces the production image of agriculture.
7. There is limited understanding of the international dependence on agriculture.
8. Agriculture is attributed a low priority in national affairs.
9. There is a limited view of the use of technology. (Image of Agriculture, p. 3)

Salaries are competitive and careers are abundant in all areas of agriculture. Agriculture is on the leading edge of biotechnology, providing an exciting career to those who wish to continue to work in such a challenging area.

According to Coulter, et al. (1986) more than 48,000 employment openings are projected annually in the U.S. for new college graduates with expertise in agriculture, natural resources, veterinary medicine and closely allied fields, but fewer than 44,000 qualified college graduates are expected to be available each year. With this predicted shortfall, it is hard to imagine a lack of interest, which is the ultimate result of students' negative opinion of careers in agriculture. In addition, since a third of Idaho's work force is agriculturally employed, a priority must be to target our youth and clarify their perceptions of the agricultural industry as a career objective.

The need to further determine youths' perceptions of agricultural careers and a need for more specific information about those perceptions formed the basis of this study.

PURPOSE AND OBJECTIVES

This study was conducted to determine how high school juniors and seniors perceive careers in agriculture. The specific objectives of the study were:

1. To determine high school students' perceptions of pursuing a career in agriculture.

2. To identify factors related to high school students' perceptions of pursuing a career in agriculture.

PROCEDURES

The population of this study was junior and senior high school students from 14 south central Idaho high schools. These schools were chosen because of their diversity in size and social and economic conditions. School size ranged from 40 students (grades 9 - 12) to 1400 students (grades 10 - 12). All schools were located in predominantly agricultural communities. The population consisted of a stratified random sample of juniors in English or history classes, and seniors from government classes. The sample totaled 619 students.

The instrument used in this study was based on an instrument developed by Mary E. Mallory and Robert Sommer from the Center for Consumer Research, University of California, Davis. It was used in a 1985 study of high school students' perceptions of agricultural careers and majors. Content validity of the modified version of the instrument used in this study was established by a panel of experts and the instrument was pilot-tested for reliability with a like group of students not in the sample.

A letter was sent to the Agricultural Science and Technology instructors on February 23, 1990 requesting their assistance and involvement in the study. All instructors and their schools agreed to participate in the study.

The instruments and instructions for the administration of the instrument were sent to the participating schools on March 5, 1990, to be distributed to the cooperating English, history and government teachers by the agriculture instructors.

A follow-up was not necessary since all instruments were returned by April 17, 1990.

Questionnaires were reviewed for missing data and coded for electronic data entry. All returned questionnaires were accepted for use. Missing data on individual items were coded as system missing and deleted from statistical computations. Data were analyzed using the Statistical Package for the Social Science (SPSSx). The .05 level of significance was selected for use in interpreting the findings of this study. Chi-square and z-scores were used to test data.

RESULTS

The respondents indicated that 51.8 percent were male and 48.2 percent were female. This distribution added credence to the randomness of sample selection.

The students' self-ascribed high school course of study indicated that most of the respondents considered themselves in a general preparation course of study.

Respondents with no involvement in secondary agriculture comprised 55.4 percent of the sample along with the following distribution: 8.8 percent 1 semester, 8.3 percent 2 semesters, 6.0 percent 3 semesters, 4.7 percent 4 semesters, 3.9 percent 5 semesters, 6.3 percent 6 semesters, 2.8 percent 7 semesters and 3.9 percent with 8 semesters.

While over 37 percent of the respondents indicated they lived in an urban home, less than 25 percent indicated their home was a farm of 50 acres or more.

A large percentage (61.9%) of the respondents had lived on a farm and those that had, indicated they liked living on a farm somewhat to very much (80.2%) (Table 1). However, less than 30 percent of the respondents indicated they would like to live on a farm in the future and less than 10 percent indicated they would like farming or ranching as work.

Table 1. Respondents' indication of farm background and future choice of residence.

Question	Frequency *	Percent
Have you ever lived on a farm?		
Yes	381	61.9%
No	233	37.8
How did you like farm life? (yes answers from above)		
Liked it very much	165	43.0
Liked it somewhat	143	37.2
Indifferent	34	8.9
Disliked it	23	6.0
Disliked it very much	19	4.9
Where would you like to live?		
Large city	56	9.1
Suburb	66	10.7
Medium city	176	28.6
Town	108	17.6
Small town	50	8.1
Farm or ranch	133	21.6
Other	26	4.2
What kind of work would you like?		
Business or industry	207	34.9
Government or public service	79	13.3
Private professional	108	18.2
Education	54	9.1
Homemaker	11	1.9
Farm or ranch	49	8.3
Other	85	14.3

* Missing responses have caused some frequencies to total less than 619

The respondents who had participated in secondary agriculture or had a rural residence or had lived on a farm were consistently more positive in their answers to the questions: Would you like a career in agriculture?; Have you ever considered a career in agriculture?; Do you think you will work in agriculture? (Table 2).

Table 2. Respondents' indication of interest in agricultural careers by participation in secondary agriculture, type of residence and farm experience.

	Secondary Agriculture		Residence		Lived	
	Yes	No	Urban	Rural	On Farm	Off Farm
Would you like a career in agriculture?						
Like Very Much	20.8%	3.5%	7.3%	24.1%	15.5%	3.8%
Like Somewhat	32.8	14.1	20.0	31.0	27.6	14.5
Indifferent	16.8	20.9	19.6	17.9	19.5	18.8
Dislike Somewhat	9.5	26.5	20.9	13.1	16.3	22.6
Dislike Very Much	13.9	24.7	22.6	10.3	14.5	28.6
I Don't Know	6.2	10.3	9.7	3.4	6.6	11.5
Have you ever considered an agricultural career?						
Yes	56.4	18.5	29.3	55.2	47.0	16.6
No	37.1	78.3	65.7	40.7	48.0	78.7
I Don't Know	6.5	3.2	4.9	4.1	5.0	4.7
Do you think you will work in agriculture?						
Yes	41.1	10.9	18.2	44.8	30.7	14.5
No	31.6	69.2	58.7	30.3	43.3	66.4
I Don't Know	27.3	19.9	23.1	24.8	26.0	19.1

The respondents were asked to rate selected outcomes of career choices according to the importance those factors had or will have on their career choice.

Noticeable differences were evident in the ratings of the selected factors found between male and female respondents and respondents with a secondary agriculture background and those students without secondary agriculture.

A stable and secure future was ranked as the most important factor in making a career decision, with females ranking it much higher in priority than males. Earning lots of money was ranked second. Males rated this outcome as being more important than females.

Males with an agricultural background were much more concerned with being their own boss and to utilize their special talents. Female non-agriculture students were more concerned about being respected in the community and working with people.

When the respondents were asked to rate how exciting or interesting selected agricultural careers were to them, again noticeable differences in responses were found between male and female respondents and respondents with a secondary agriculture background and those students without secondary agriculture.

Male agriculture students indicated an interest in aquaculture, farming, and environmental management, while male non-agriculture students preferred biology, biotechnology, and genetic engineering.

Female agriculture students were interested in food science, plant science, applied economics, food safety, and community nutrition. Non-agriculture female students preferred applied economics, food safety, and community nutrition; although their mean responses were much lower than the female agriculture students or the male respondents.

The respondents were asked to indicate (using adjective pairs) their opinion of a career in agriculture. Noticeable differences were evident in responses found between male and female respondents and respondents with a secondary agriculture background and those students without secondary agriculture.

Non-agriculture oriented males perceived a career in agriculture as being boring while agriculture oriented males perceived agriculture careers as being interesting. Both male and female agriculture students felt that agriculture careers paid well, compared to the non-agricultural oriented male and females. Male respondents thought that agriculture careers were mainly for men compared to the female respondents.

The respondents were asked to indicate how well selected phrases describe careers in agriculture. Noticeable differences in responses were found between male and female respondents and respondents with a secondary agriculture background and those students without secondary agriculture.

Male agriculture students felt agriculture careers were creative, secure, high in use of special talents, and lets you be your own boss. Female respondents with an agriculture background felt agriculture careers allows you to work with people and earns respect within the community. Non-agriculture students rated these factors very low when dealing with agricultural careers.

At the end of the questionnaire respondents were invited to make additional comments. Approximately 13 percent of the respondents made additional comments. Most comments tended to be slightly negative with students indicating agriculture was mainly farming and hard, boring work. Representative comments were selected and placed into 4 categories: 1. Agriculture is boring, I'm not interested, low prestige, doesn't pay; 2. Never heard about it, need more information; 3. Agriculture is important but not for me, and; 4. I like agriculture, more people should see it's importance, great deal of demand on it in future, brings you close to nature.

CONCLUSIONS

Based on the findings of this study, the following conclusions were formed:

1. Students in the population represented by the sample of this study had an inadequate perception of the agricultural industry and agricultural careers. The respondents preferred careers that would supply a stable and secure future and the ability to earn lots of money. Yet when asked about agricultural careers the respondents perceived agricultural careers offered no job security and the pay would be minimal. Students also perceived their only agricultural career option as agricultural production or more specifically farming and ranching.

2. Students in the population represented by the sample of this study perceived an agricultural career as boring, hard work, with poor pay and

involving more muscle than brain. They perceived an agricultural career as an outdoor job that involves more men than women.

3. A factor identified as related to the respondents' perceptions of agricultural careers seemed to be secondary education in agriculture. Respondents who have had some background in high school agriculture seemed to be more interested in pursuing an agricultural career than were non-agricultural students. Over 56.4 percent of the respondents who had participated in secondary had considered a career in agriculture, while only 18.5 percent of the non-agriculture respondents had considered a career in agriculture.

4. Another factor identified as being related to the respondents' perceptions of agricultural careers was home residence and whether or not the respondents had ever lived on a farm. Respondents who have lived on sizeable acreages or on farms indicated a higher interest in agricultural careers.

5. The results of this study support the findings of Mallory and Sommer (1986) and Orthel, et al. (1989).

6. The respondents seemed to be unaware of the diversity and availability of agricultural careers and how those careers meet many people's needs in a career.

RECOMMENDATIONS

Based on the conclusions of this study, the following recommendations are offered to those involved with agricultural career information and recruitment initiatives:

1. Students' perceptions of agricultural careers as being an under paid, low prestige, male oriented occupation need to be corrected and students need to be shown that careers in agriculture are numerous, diverse, well paid, stable, advanced in technology, and requiring advanced education.

2. As indicated in the study the exposure to agriculture, through parents working in agriculture, through high school agriculture education, and positive agricultural experiences, is generally related to positive attitudes toward agricultural careers. These positive attitudes need to be nourished and cultivated in order to successfully improve the image of careers in agriculture.

IMPLICATIONS

Based on the findings and conclusions of this study, the following implications were identified:

1. If high school students see agriculture as nothing more than farming and ranching then correcting that perception represents a major task for agricultural educators.

2. Students who had participated in agriculture classes in high school seemed to be more interested in pursuing agriculture as a career. If the

student base can broadened to include more non-traditional students, the negative perceptions of agricultural careers could be altered.

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CAREERS IN AGRICULTURE AS PERCEIVED BY HIGH SCHOOL JUNIORS AND SENIORS

A Critique

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Contributions and Significance of the Research

The literature is replete with evidence that many misconceptions exist about agricultural careers among the public. This study replicates a study conducted by Mallory and Sommer at the University of California, Davis in 1985. It is significant because the study in California focused more on youth in urban areas and the Idaho study focused on youth in agricultural areas. Also, the California study did not have a large enough sample of students who were enrolled in agricultural courses to make any genuine comparisons between students who had studied agriculture and those who had not. Although the findings of the Idaho study support the findings by Mallory and Sommer, it is clear that students who have backgrounds in secondary agriculture do have more positive perceptions of agricultural careers.

Procedural Considerations

Appropriate research procedures were followed. The objectives were clear, the population was limited to 14 south central Idaho high schools. Using a stratified random sample of students in junior English or history classes and senior government classes were selected. The researchers did not indicate what rationale was used for setting the sample size (619) and if it was representative of the population. The instrument used was developed for a prior study by Mallory and Sommer. Content validity was established, but no information was given on reliability. A brief description of the instrument would be helpful to the reader in understanding the different parts of the instrument. Appropriate data analysis was used. The results section was concise, but subtitles or reference to the objectives would add clarity.

Questions Raised

1. It appeared that lack of information about agriculture and a lack of exposure to agricultural experiences had a major impact on students negative perceptions of agricultural careers. What implications these findings have for formulating agricultural literacy programs appears to be an important next step.

2. Does gender or ethnicity play a role in students' perceptions of agricultural careers? It would be interesting to analyze the data further to look at these factors or conduct a follow-up study.

3. This study suggests that a very different kind of educational program is needed in agricultural education if the masses of high school students are to have a positive image about agricultural careers. It is apparent that future research should focus on evaluating programs that can effectively change students' images of agricultural careers.

FACTORS AND PERSONS INFLUENCING HIGH SCHOOL STUDENTS TO ENROLL IN VOCATIONAL AGRICULTURE PROGRAMS

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INTRODUCTION

National and state trends indicate a collegiate shift toward business and technical majors for both sexes according to a North Dakota Department of Public Instruction report (1988). Yet business, industry, labor, and agriculture have increasing demands for young people with the skills to fill entry level positions. The youth population, however, is declining. In addition, student enrollment in vocational agriculture programs in North Dakota has declined steadily since 1980 (Janke, 1988). Lentz (1988) indicated that in order to meet tomorrow's needs for trained work force entrants, we must dramatically increase the percentage of youth in vocational education. That means knowing how to recruit students.

Kotrlik and Harrison (1986) surveyed over 19,000 students to determine what person influenced their career decisions most. Four of the top six influential persons were family members. Parents were followed in order by friends, a person in the occupation, grandparents or other relatives, and a brother or sister. This study also reported that vocational students were asked which vocational teacher had the greatest impact on their career decisions. The agriculture and business education teachers were marked as having the greatest influence. The study concluded that persons in the home continue to exert more influence on the career decisions of high school students than other educators.

A study conducted in Wyoming (Young, 1985) identified parents, peers, teachers, counselors, and siblings as the key influencing individuals in students' selection of courses, occupational training, and ultimately, occupations.

Norris and Townsend (1987) when addressing declining enrollment in vocational agriculture emphasized an immediate need for creative recruitment of students. They concluded that aggressive recruitment measures might include assistance of successful former students, videotaped materials or pamphlets explaining agricultural occupations, and currently enrolled students acting as ambassadors for spreading the word that agriculture is a viable industry which offers much more today than in previous years.

McMullen (1985) noted that teachers are closer to the students than are guidance counselors and administrators. For this reason, they have valuable insights in the areas of public relations and student recruitment. Administrators should encourage teachers to speak publicly about the value of vocational education and should involve teachers in the formation of public relations plans.

A study to determine the factors and persons influencing students to enroll in vocational agriculture programs was needed in North Dakota due to the declining enrollments. Individuals wanting to increase enrollment in vocational agriculture programs often lacked knowledge concerning who and what influenced students' curriculum choices.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine what influence various factors and persons had on high school students' decisions to enroll in secondary vocational agriculture programs.

The objectives of the study were to:

1. determine how students first learned about what was taught in the vocational agriculture program;

2. determine the level of influence selected factors had on the decision of high school students to enroll in vocational agriculture programs; and

3. determine the level of influence selected persons had on the decision of high school students to enroll in vocational agriculture.

PROCEDURES

The population of this study consisted of all ninth grade students enrolled in vocational agriculture in North Dakota in the Fall of 1988. A sample of students was obtained by selecting 24 schools to participate in the study. North Dakota is comprised of eight vocational agriculture/FFA districts. Three schools from each district were randomly selected to participate.

Approximately 3600 students were enrolled in the 83 vocational agriculture programs. Prior to the selection of the 24 schools, it was not known now many students would be included in the study. According to Krejcie and Morgan (1970), a population of 3,600 requires a sample size of 347. Because there were fewer than 3,600 ninth graders enrolled in vocational agriculture and because the number of returned questionnaires totaled 331, the sample size was above that recommended by Krejcie and Morgan.

Data were gathered by use of a mail survey questionnaire developed by the researchers. The instrument consisted of items that would provide data relevant to the participants' backgrounds; how students learned about what was taught in the vocational agriculture program; factors influencing students' decision to enroll in vocational agriculture; and the extent certain persons influenced students' decisions to enroll. These items were gleaned from previous research and included the researcher's own additions. The questionnaire was pilot tested for content validity and understandability by administering it to students in a school that was not included in the sample. Final revisions of the instrument were made following the pilot test.

A cover letter, questionnaires, and a return envelope were mailed to each of the 24 randomly selected vocational agriculture program teachers on October 10, 1988. The first mailing resulted in a return of 318 questionnaires from 23 vocational agriculture programs. A phone call to the remaining non-responding program instructor resulted in an additional return. This yielded a total of 331 responses from 24 schools for a 100 percent response rate.

ANALYSIS OF DATA

The collected data were entered into a computer for analysis. Frequencies and percentages were used to report results regarding background characteristics of the responding students and how students first learned about their vocational agriculture programs. Frequencies, mean scores, and standard deviations were used to report results of data concerning the factors and persons influencing students to enroll in vocational agriculture. The reliability of the instrument was determined to be .89 using Cronbach's Alpha.

RESULTS

BACKGROUND CHARACTERISTICS

A total of 296 or 89.4 percent of the respondents were male and 35 or 10.6 percent were female as reported in Table 1. A total of 281 students (84.9 percent) had farm experience while 50 (15.1 percent) did not.

Table 1

Background Characteristics of Respondents

Characteristics	Number	Percent
Sex:		
Male	296	89.4
Female	35	10.6
Total	331	100.0
Farm Experience:		
Yes	281	84.9
No	50	15.1
Total	331	100.0

SOURCE OF KNOWLEDGE ABOUT VOCATIONAL AGRICULTURE

Students were asked to indicate one source from which they gained most of their knowledge about what is taught in the vocational agriculture program. Table 2 reveals the majority of the student respondents (60.4%) indicated they gained that knowledge from the vocational agriculture teacher. Other people who were reported to have provided that knowledge included family members (20.5%) and friends and other students (10.6%). The news media and guidance counselors (0.3% each) were least likely to provide information to students about what is taught in vocational agriculture.

Table 2

Sources of Students' Knowledge About Vocational Agriculture

Sources	Number	Percent
Vocational agriculture teacher	200	60.4
Guidance counselor	1	0.3
Other teachers	4	1.2
Family members	68	20.5
Friends (other students)	35	10.6
News media (radio, TV, newspaper)	1	0.3
School handbook	8	2.4
Other students	8	2.4
Other	6	1.8

FACTORS INFLUENCING STUDENTS TO ENROLL IN VOCATIONAL AGRICULTURE

Table 3 reports the extent certain factors influenced students to enroll in the vocational agriculture program. The factor which influenced students most was a desire to gain the knowledge and skill used in mechanics (X = 2.95). The desire to gain basic knowledge and skill used in agriculture (X = 2.79) and those used in leadership (X = 2.76) were ranked second and third respectively in terms of their influence on students to enroll in vocational agriculture. Other factors which seemed to influence their decision to enroll included: the desire to learn more about careers in agriculture (X = 2.67); the good reputation of the teacher (X = 2.65); the desire to prepare for an occupation upon graduation from high school (X = 2.63); and the desire to gain knowledge and skill used in crop and forage production (X = 2.60). The fact that all these factors were in the range of "some influence" to "moderate influence" is an indication that none of them seemed to have a strong influence on student enrollment in the vocational agriculture program.

Table 3

Factors Influencing Students to Enroll in Vocational Agriculture

Factors	Mean*	S.D.
1. to gain knowledge and skill used in mechanics	2.95	.969
2. to gain basic knowledge and skill used in agriculture	2.79	.980
3. to gain knowledge and skill used in leadership	2.76	.872
4. to learn more about the careers in agriculture	2.67	.926
5. good reputation of the teacher	2.65	.959
6. to prepare for an occupation upon graduation from high school	2.63	1.014

Table 3, continued

Factors	Mean	S.D.
7. to gain knowledge and skill used in crop/forage production	2.60	.906
8. reputation of the vocational agriculture program	2.48	.925
9. to gain knowledge and skill used in marketing and financial management	2.46	.960
10. to gain knowledge and skill used in animal science	2.46	.950
11. reputation of the FFA Chapter	2.41	.963
12. to gain knowledge and skill used in business management	2.41	.947
13. to prepare for courses at a four year university	2.33	1.118
14. to gain knowledge and skill used in the processing of agricultural products, such as meats and dairy	2.32	.905
15. to gain knowledge and skill used in plant science	2.26	.977
16. to gain knowledge and skill used in soil science	2.14	.935
17. to gain knowledge and skill used in horticulture	2.01	.872
18. to prepare for courses at a two year technical school	2.01	.978
19. needed a class to fill my schedule	1.90	1.070
20. to get an easy "A"	1.83	1.034
21. to get more friends	1.74	1.014
22. assigned to course by guidance counselor or administration	1.57	.910
23. no other classes to take	1.54	.915

*Scale: 4 = extreme influence; 3 = moderate influence; 2 = some influence; 1 = no influence.

Factors which had the least influence on students' enrollment in vocational agriculture were not having other classes to take (X = 1.54) and being assigned to the course by the guidance counselor or administrator (X = 1.57). This finding helps overcome the feeling by some vocational agriculture teachers that some students are dumped into their program.

PERSONS INFLUENCING STUDENTS TO ENROLL IN VOCATIONAL AGRICULTURE

Students were asked to indicate the degree of influence they felt certain persons had on their decision to enroll in vocational agriculture. Table 4 reveals that the person who had the most influence on students to enroll in vocational agriculture was their father or guardian (X = 2.28). Other persons having an influence included: friends (X = 2.23); the vocational agriculture teacher (X = 2.08); and current vocational agriculture students (X = 2.08). Respondents indicated county agents (X = 1.32) and guidance counselors (X = 1.35) as having the least influence on their decision to enroll in vocational agriculture.

Table 4

Persons Who Influenced Students to Enroll in Vocational Agriculture

Persons	Mean*	S.D.
Encouragement from:		
1. father (guardian)	2.28	1.113
2. friends	2.23	1.044
3. current vocational agriculture students	2.08	.990
4. vocational agriculture instructor	2.08	1.138
5. past vocational agriculture students	1.96	1.010
6. mother (guardian)	1.92	1.223
7. relative(s) other than previously mentioned	1.71	.966
8. brother(s)/sister(s)	1.66	1.000
9. school faculty/staff other than counselors and vocational agriculture instructors	1.57	.855
10. FFA alumni (chapter members)	1.56	.855
11. neighbors	1.47	.814
12. 4-H leader(s)	1.39	.756
13. employer(s)	1.39	.784
14. guidance counselor	1.35	.734
15. county agent	1.32	.721

*Scale: 4 = extreme influence; 3 = moderate influence; 2 = some influence; 1 = no influence.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the findings, the following conclusions have been drawn:

1. Most students learned what was taught in the vocational agriculture program from the vocational agriculture teachers. Guidance counselors had almost no impact on educating students about what was taught in the vocational agriculture programs.

2. Students were enrolling in vocational agriculture programs to gain knowledge and skill in mechanics and to learn the basic knowledge and skill used in agriculture. Students, in general, do not enroll in vocational agriculture programs because they have no other classes to take nor because they have been assigned to the course by guidance counselors or administrators.

3. The father (guardian), friends, vocational agriculture instructor, and current vocational agriculture students tended to have the most influence on students' decisions to enroll in vocational agriculture. The guidance counselor and county agent have least amount of influence.

The following recommendations have been offered for consideration:

1. County agents and school guidance counselors should be made aware of vocational agriculture program offerings and the benefits of such programs. Students surveyed indicated guidance counselors and county agents had little

influence on their decisions to enroll in vocational agriculture programs, but a program intending to bolster enrollment could benefit from the cooperation of an informed county agent or guidance counselor.

2. Parents and guardians have an influence concerning what curriculum their children will pursue. It seems imperative then that they be knowledgeable and familiar with the local vocational agriculture program.

3. Vocational agriculture programs should continue to offer a curriculum which explores potential agricultural careers and familiarizes students with the general basic knowledge and skill used in agriculture and mechanics.

4. Results of this study indicated that many non-farm students were enrolled in vocational agriculture. Teachers should continue to encourage non-farm students to explore vocational agriculture opportunities. Teachers should also stress that living on a farm is not a prerequisite for enrolling in vocational agriculture.

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FACTORS AND PERSONS INFLUENCING HIGH SCHOOL STUDENTS TO ENROLL IN VOCATIONAL AGRICULTURE PROGRAMS

A Critique

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Contributions and Significance of the Research

This study examined what influence various factors and persons had on high school student's decisions to enroll in secondary vocational agriculture programs. Due to declining enrollments of secondary agriculture students in many states, this study is significant and timely. The literature reviewed indicated that parents, other family members, teachers, and counselors were the most influential in a students career decisions. Although this study focused on the level of influence selected persons had on high school students decision to enroll in agriculture and several related objectives, it was interesting to find that the parent was again found to have the most influence.

Procedural Consideration

The researchers are to be commended for following accepted procedures in selecting the sample, collecting the data, and developing the instrument. Appropriate data analysis was conducted given the descriptive nature of the study. The paper was well organized, easy to understand and the conclusions were well documented by the findings.

Questions Raised

The researchers may want to address the following questions as they continue their research on this topic:

1. If the real problem being researched is why North Dakota students do not enroll in agriculture courses, it seems reasonable that students who did not enroll as ninth graders should have been included in the study.

2. Means that were used to denote the greatest amount of influence were in the two range. The scale indicated that this inferred "some influence." Yet the researchers, for example, concluded that the father tended to have the most influence on students decision to enroll in agriculture courses. Is this the correct conclusion?

3. What rationale was used to include only ninth grade students in this study?

4. The highest mean reported as influencing students to enroll in agriculture was "to gain knowledge and skill used in mechanics." The question as to why students perceived mechanics to influence their decision to enroll would be an interesting follow-up study.

5. Did the researchers take any steps to minimize the chance that the teachers of agriculture who administered the instruments to the students did not influence or bias the responses?

THE RELATIONSHIP BETWEEN THE LOCATION OF STUDENTS' HIGH SCHOOL AND THEIR ACADEMIC PERFORMANCE IN A COLLEGE OF AGRICULTURE

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INTRODUCTION

The trustees at The Ohio State University announced in April, 1982, a policy requiring entering freshmen to complete a college preparatory curriculum in high school in order to be admitted "unconditionally". The policy took effect autumn quarter, 1984. A student not meeting the requirements is admitted on a "conditional" basis, the condition being to take courses in deficient subjects that do not count toward graduation or to show competence in the deficient area(s) by placement tests. Concurrent to the policy change was a decline in enrollment in The Ohio Sate University College of Agriculture. Students from rural backgrounds have traditionally made up the largest percentage of student enrollment in the College of Agriculture. Additionally, students enrolled in the College of Agriculture typically attended high school in Ohio (Reisch, 1986). Research by Odell (1986), Fails (1989), and Barcinas (1989) found that rural schools in Ohio lack the resources of urban schools. The inequality of resources between rural and urban schools coupled with the new course requirements raises questions about the possible effect of the admission policy on rural students and their academic performance in the College of Agriculture.

THEORETICAL FRAMEWORK

From Florida to California, a growing number of colleges and universities have increased academic entrance requirements for entering freshmen (McCurdy, 1982). States that have implemented and/or increased admission requirements include California, Florida, Texas, Utah, Oregon, Tennessee, Washington, Idaho, Montana, New Mexico, Wyoming, and Ohio. Walsh (1989) noted the following:

> Attracting and keeping rural youngsters on our land grant campus is growing increasingly difficult. Access is being limited, admission standards are rising steadily, and increasing tuition are growing concerns. This leads me to the following question: Are increasing entry requirements and tuition costs changing Land Grant institutions from the people's university to the university of the well-off and educationally privileged? As rural economies have declined, so have rural services. Rural schools often are not keeping up with urban schools in terms of course offerings. Foreign language training and advanced science and math offerings are sometimes thin.(p. 2)

Educational researchers generally agree that small schools located in rural communities are uniquely different from large schools located in urban or metropolitan areas (Odell, 1986). Researchers also concur that the worsening economic conditions in the rural areas of America have led to a severe shortage of resources for residents of rural areas (Aikman, 1982; Boyd & Immegart, 1977; Brown, 1983). This declining rural economy has affected the lives of students who attend schools in rural communities. Carmichael (1982) stated that rural schools tend to 1) offer a more limited curriculum than metropolitan schools, 2) offer fewer libraries and fewer programs for special populations, and 3) employ fewer support personnel for education services.

Brown (1985), in a review of literature, cited a number of studies that indicated that rural students in higher education have a higher attrition rate then their urban counterparts. Brown (1985) suggested that lower academic achievement on the part of rural students may be due, in part, to limited access to college preparatory course offerings in high school and lack of social and interpersonal interactions. Brown (1985) also asserted that the rural social system contributes to the rural dropout rate from higher education. In a study of freshmen at the University of Colorado, Aylesworth and Bloom (1976) found that rural freshmen were not distinguishable from the urban freshmen and received equivalent college grades. Rural students, nonetheless, had a lower retention rate than their urban counterparts.

High school class rank and ACT scores are commonly used predictors of college success. Merante (1983) in a review of variables which are used to predict student success in college commented that rank in graduating class is the best single predictor of success. Thornell and Jones (1986) found secondary school performance was a better predictor of freshman GPA than the ACT composite score at a small state university in Mississippi. Results indicated high school rank was a significant predictor while ACT composite score was not significant. Jacobs (1985) found the best single predictor of college GPA for both males and females was relative high school rank. Trusheim and Crouse (1982) in a study of data from the National Longitudinal Study of the high school class of 1972 found high school rank was the best single predictor of freshman college grades. Conversely, Synder and Elmore (1983) found that ACT was the best predictor of student success as defined by cumulative GPA. Rowan (1978) concluded that ACT validly predicted GPA at yearly intervals over the four-year span of the two classes studied. Rowan (1978) also concluded the ACT predicted graduation on time. A study by Price and Kim (1976) found ACT scores and high school grades are both significant predictors of college performance. However, Price and Kim (1976) concluded ACT scores are better able to predict a person's ability to perform in college.

PURPOSE AND RESEARCH QUESTIONS

The purpose of this study was to investigate the relationship between the academic achievement of new first quarter freshmen (NFQF) in The Ohio State University College of Agriculture and the rural, semi-rural, suburban, or urban location of their high schools. The following research questions were used to guide the study.

1. What was the composition of the populations of NFQF in the autumn quarters of 1982 through 1985 in terms of rural, semi-rural, suburban, and urban students?

2. What was the admission status of rural, semi-rural, suburban, and urban students who entered the College of Agriculture as NFQF in the autumn quarters of 1982 through 1985?

3. What was the relationship between the location of the students' high school and the retention of these students in the College of Agriculture for the populations of NFQF in the autumn quarters of 1982 through 1985?

4. How much of the variance in Final College Grade Point Average of the 1982 through 1985 autumn quarter College of Agriculture NFQF was explained by the location of the high school attended (rural, semi-rural, suburban, and urban), graduating class size, interaction between location of the high school and graduating class size, class rank, and ACT composite score?

METHODS

This study was descriptive and correlational in nature. The longitudinal survey method was used to collect data for describing the characteristics of autumn NFQF in the land grant university being investigated. The populations for the study were defined as the autumn NFQF in The Ohio State University College of Agriculture for the years 1982 through 1985. The study was a census. Data pertaining to the research questions were obtained from students' records at the university including transcripts of high school courses, aptitude tests (ACT), and high school class rank. High schools were classified as either rural, semi-rural, suburban, or urban based on the county in which the school was located. Counties were categorized as rural, semi-rural, suburban, or urban based on the following criteria:

> Rural - Rural location was based on criteria used in previous rural studies in Ohio by Odell (1986), Fails (1989), and Barcinas (1989). For the purposé of this study, rural location meets the following criteria: (1) a public school located in a county outside the Metropolitan Statistical Area (MSA) as defined by Ohio Facts (Clements, 1988) based on the 1980 Ohio population census; and (2) a public school located in a county with a total population under 40,000, as defined by the 1980 Ohio population census.
>
> Semi-Rural - Semi-rural location was an extension of the criteria established by Odell (1986), Fails (1989), and Barcinas (1989). This criteria includes: (1) a public school located in a county outside MSA as defined by Ohio Facts (Clements, 1988) based on the 1980 Ohio population census; and (2) a public school located in a county with a total population of greater than 40,000 but less than 200,000, as defined by the 1980 Ohio census or (1) a public school located in a county inside the MSA as defined by Ohio Facts (Clements, 1988) based on the 1980 Ohio population census; and (2) a public school located in a county with a total population under 40,000, as defined by the 1980 Ohio population census.
>
> Suburban - Suburban location is based on the following criteria: (1) a public school located in a county inside the MSA as defined by Ohio Facts (Clements, 1988) based on the 1980 Ohio population census; and (2) a public school located in a county with a total population of greater than 40,000 but less than 200,000, as defined by the 1980 Ohio population census.
>
> Urban - Urban location was based on the criteria developed by Barcinas (1989). These criteria include: (1) a public school located in a county inside the MSA as defined by Ohio Facts (Clements, 1988) based on the 1980 Ohio population census; and (2) a public school located in a county with a total population of greater than 200,000, as defined by the 1980 Ohio population census.

Descriptive and correlational statistics were used to analyze the data.

RESULTS

The composition of NFQF in terms of urban, suburban, semi-rural, and rural students fluctuated from 1982 to 1985 (Table 1). The proportion of NFQF comprised of each of the respective types of students varied from approximately 19% to around 32%. There was no discernible trend in the fluctuating composition of NFQF for 1982 to 1985. The total proportion of urban and suburban students (49.8%) was approximately equal to the percentage of semi-rural and rural students (50.2%) when the overall data were examined.

Table 1. Composition of New First Quarter Freshmen in the Autumn Quarters of 1982 to 1988 in Terms of School Location

	Urban		Suburban		Semi-Rural		Rural		Total	
Year	n	%	n	%	n	%	n	%	n	%
1982	45	25.0	50	27.8	49	27.2	36	20.0	180	100
1983	41	29.1	33	23.4	29	20.6	38	27.0	141	100
1984	47	25.3	50	26.9	53	28.5	36	19.4	186	100
1985	35	21.0	34	20.4	52	31.1	46	27.5	167	100
Total	168	24.9	167	24.8	183	27.2	156	23.1	674	100

The unconditional/conditional admissions policy was implemented in 1984. For purposes of this study the years 1982 and 1983 were reported as if the policy had been implemented. The percentage of NFQF that were admitted unconditionally varied from 12% in 1982 to 55.9% in 1985 (Table 2). The percentages of rural NFQF that were admitted unconditionally ranged from 20% in 1982 to 55.6% in 1985. The ranges for the percentages of urban NFQF being admitted unconditionally varied from 11.9% in 1982 to 75.8% in 1985. The percentage of NFQF admitted unconditionally to the College of Agriculture has steadily increased since 1982. The proportion of urban students admitted unconditionally showed rapid increase from 1983 to 1985, growing from 30% to 76%. In comparison, the percentages of suburban, semi-rural, and rural admitted unconditionally increased from approximately 18% to 50% during the same time period.

Table 2. Admission Status by School Location

Year	Urban		Suburban		Semi-Rural		Rural		Total	
Status	n	%	n	%	n	%	n	%	n	%
1982 (N=180)										
Conditional	37	88.1	45	93.8	39	88.6	28	80.0	149	88.2
Unconditional	5	11.9	3	6.3	5	11.4	7	20.0	20	11.8
1983 (N=141)										
Conditional	28	70.0	27	81.8	24	85.7	30	81.1	109	79.0
Unconditional	12	30.0	6	18.2	4	14.3	7	18.9	29	21.0
1984 (N=186)										
Conditional	23	57.5	36	73.5	39	75.0	26	74.3	124	70.5
Unconditional	17	42.5	13	26.5	13	25.0	9	25.7	52	29.5
1985 (N=167)										
Conditional	8	24.2	17	51.5	26	52.0	20	44.4	71	44.1
Unconditional	25	75.8	16	48.5	24	48.0	25	55.6	90	55.9

Retention in the College of Agriculture was defined as whether a student had graduated or was still enrolled in the college five years after entry. There was a low relationship (Cramer's V=.14 to .18) between the retention of NFQF in the College of Agriculture and school location for the 1982 to 1984 populations (Table 3). A greater proportion of NFQF were more likely to be retained in the College of Agriculture. A greater percentage of the students retained from 1982 and 1984 NFQF were more likely to be semi-rural students. Of the 1983 NFQF that were retained a greater proportion were rural and urban students. A greater percentage of urban and suburban 1982 to 1984 NFQF were more likely to be dismissed or withdraw voluntarily from the university. Additionally, in 1983 a greater proportion of semi-rural students were more likely to be dismissed. There was a negligible to low relationship (Cramer's V=.10) between the retention of 1985 NFQF and school location.

Hierarchical multiple regression analysis was used to determine the amount of variance in final college GPA explained by high school location, graduating class size, interaction between high school class size and school location, class rank, and ACT Composite score. School location was dummy coded with rural location being the comparison group. The interaction between class size and school location variables was coded by multiplying the class size by the three dummy coded variables representing school location. This created a set of three variables which represent the interaction between class size and school location (Cohen & Cohen, 1983). Class size, class rank, and ACT Composite scores were all intervel level. The dummy coded and interval variables were regressed on the 1982 to 1985 NFQF final college GPA. The four regressions on final college GPA were very similar. Consequently, only the regression on the 1985 NFQF will be discussed in the text.

Table 3. Relationship Between Retention in College and School Location

	Urban		Suburban		Semi-Rural		Rural		Total	
†Status	n	%	n	%	n	%	n	%	n	%
1982 (N=180)										
Ag Graduate	25	21.0	32	26.9	36	30.3	26	21.8	119	66.1
Dismissed	11	31.4	11	31.4	8	22.9	5	14.3	35	19.4
Withdrew	7	38.9	6	33.3	1	5.6	4	22.2	18	10.0
Transfer Grad	2	25.0	1	12.5	4	50.0	1	12.5	8	4.4
Cramer's V	.14									
1983 (N=141)										
Ag Graduate	27	30.3	20	22.5	17	19.1	25	28.1	89	63.1
Dismissed	7	28.0	4	16.0	9	36.0	5	20.0	25	17.7
Withdrew	5	23.8	8	38.1	2	9.5	6	28.6	21	14.9
Transfer Grad	2	33.3	1	16.7	1	16.7	2	33.3	6	4.3
Cramer's V	.14									
1984 (N=186)										
Ag Graduate	23	18.1	34	26.8	42	33.1	28	22.0	127	68.3
Dismissed	7	30.4	5	21.7	6	26.1	5	21.7	23	12.4
Withdrew	12	52.2	8	34.8	2	8.7	1	4.3	23	12.4
Transfer Grad	5	38.5	3	23.1	3	23.1	2	15.4	13	7.0
Cramer's V	.18									
1985 (N=167)										
Ag Graduate	20	18.2	24	21.8	37	33.6	29	26.4	110	65.9
Dismissed	6	21.4	5	17.9	8	28.6	9	32.1	28	16.8
Withdrew	3	23.1	4	30.8	3	23.1	3	23.1	13	7.8
Transfer Grad	6	37.5	1	6.3	4	25.0	5	31.3	16	9.6
Cramer's V	.11									

†Ag. Graduate=Graduated from College of Agriculture; Dismissed=Dismissed while on academic probation; Withdrew=Withdrew voluntarily from OSU; Transfer Grad=Transferred to another college at OSU and graduated

Summary data indicated that there was a very strong relationship (r=.70) between class rank and final college GPA (Table 4). There were substantial correlations between ACT score and final college GPA (r=.62) as well as ACT score and class rank (r=.56).

Table 4. Summary Data: Regression of College and Agriculture Grade Point Average and Selected Variables for 1985 New First Quarter Freshmen (n=155)

Variables	Intercorrelations X_1	X_2	X_3	Y_1	Mean	SD
Class Size (X_1)	1.00	.02	.15	.05	163.5	106.8
Class rank (X_2)		1.00	.56	.70	76.8	20.8
ACT Score (X_3)			1.00	.62	21.8	4.6
Final College GPA (Y_1)				1.00	2.70	.68

A hierarchical regression analysis was conducted to ascertain the amount of variance in final college GPA explained by the variables of interest (Table 5). The regression model with the main effect sets of variables, school location and class size, and the interaction set of variables was loaded first and explained 4.3% of the variance in final college GPA. The main effect of school location explained 1.6% of the variance in final college GPA. The main effect of class size explained no variance in students' final college GPA. The interaction effect explained 2.7% of the variance in the dependent variable. Class rank was entered next into the regression. This variable explained 47.7% of the variance in final college GPA. The last variable entered into the regression was ACT composite score. ACT Composite score explained an additional 6.2% of the variance in final college GPA. The final R^2 of .582 indicated that the total variance explained by the optimal linear relationship of the dependent variable with the independent variables in the full model was 58.2%.

Table 5. Regression of Final College Grade Point Average on School Location, Class Size, Class Rank, and ACT Composite Score for 1985 New First Quarter Freshmen (n=155) (Hierarchical Entry)

Variables	R^2	R^2 change
Model w/ Main Effects & Interaction	.043	.043
Main Effect School Location	.016	
Main Effect Class Size	.000	
Interaction Class Size X Location	.027	
Class Rank	.520	.477
ACT Composite Score	.582	.062

CONCLUSIONS AND/OR RECOMMENDATIONS

The balanced composition of urban, suburban, semi-rural, and rural NFQF indicates that the College of Agriculture does not rely exclusively on students from rural backgrounds. Students from urban and suburban areas constitute a considerable proportion of NFQF during the period of the study. The College of Agriculture should continue to recruit high quality students from urban/suburban backgrounds, as well as from semi-rural and rural counties, the traditional source of students for colleges of agriculture.

The percentage of NFQF that met the requirements for unconditional admission increased from 1982 to 1985. The proportion of urban NFQF that met the requirements for unconditional admission was greater than the percentage of suburban, semi-rural, and rural students fulfilling the requirements for unconditional admission. This greater percentage of urban NFQF completing the preparatory curriculum as well as previously reported results (Raven & Barrick,

1991) suggests that perhaps urban students had more academic opportunities in high school than suburban, semi-rural, and rural students. The findings suggest that the greater number and variety of courses available to urban students help them meet the curriculum requirements for unconditional admission. These findings help support the conclusion of Barcinas (1989) that there may be more academic resources available for urban students.

Aylesworth and Bloom (1976) found that rural freshmen were not distinguishable academically from the urban freshmen and received equivalent college grades. The finding that the amount of variance in final college GPA explained by school location was of little practical significance tends to support the findings of Aylesworth and Bloom (1976) that rural and urban students are similar in terms of college GPA. However, the greater retention rate of rural students in this study does not support the findings of Brown (1985) and Aylesworth and Bloom (1976) that rural students had a lower retention rate than their urban cohort.

The findings of this study that class rank explained the most variance in final college GPA supports the findings of Thornell and Jones (1986), Merante (1983), Jacobs (1985), and Trusheim and Crouse (1982) that rank was the best predictor of college GPA. The amount of variance explained by NFQF's ACT scores was of practical significance since approximately 7% of the variance in college GPA was being explained by ACT scores when controlling for the other variables of interest. This supports the findings of Rowan (1978) and Price and Kim (1976). The findings of this study that ACT explains a practically significant part of the variance in college GPA were not consistent with Synder and Elmore (1983).

The data suggest that urban students were more academically prepared than rural and semi-rural students from 1982 to 1985. However, the findings indicate their final college GPAs were nearly undistinguishable from one another suggesting their are additional factors which contribute to academic success in college. In fact, urban and suburban students were more likely to be dismissed or withdraw voluntarily from the university. Regression on final college GPA indicated that the best predictor of final college GPA was class rank. The findings of this study indicate that it was not what students took in high school or where they went to high school that determined how well they did in the College of Agriculture, but rather how well they did in their courses at their respective schools was more meaningful in explaining academic success in the College of Agriculture. Currently, the two primary criteria for admission into The Ohio State University are the completion of the required college preparatory curriculum and percentile class rank. The admissions office should place more emphasis on students' class rank and less on the high school courses taken by NFQF. Finally, continued research is needed to determine other variables that help explain academic success in college.

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THE RELATIONSHIP BETWEEN THE LOCATION OF STUDENTS' HIGH SCHOOL AND THEIR ACADEMIC PERFORMANCE IN A COLLEGE OF AGRICULTURE

A Critique

Robert J. Birkenholz, University of Missouri — Discussant

This paper reported an interesting study of the relationship between high school location and the academic performance of students in a college of agriculture. The authors reported described the problem in the context of increased admissions requirements which potentially discriminated against students from rural schools. The theoretical framework appropriately presented previous studies which addressed the predictor variables included for data analysis. The purpose of the study and the objectives were clearly stated.

The following questions are offered in an attempt to clarify certain aspects of the study.

1. Are you confident that the school location classification system used in the study adequately distinguished schools, especially the semi-rural and suburban categories?

2. What was the basis for the statement "A greater proportion of NFQF were more likely to be retained in the College of Agriculture"? What was the basis for comparison?

3. Could the data presented in Table 3 have been collapsed into one data set for analysis (rather than analyzing each year separately) to reduce the number of cells with a low *n*?

4. Is it appropriate to compare the retention rate of college of agriculture students with the results of studies by Brown (1985) and Aylesworth and Bloom (1976) who appeared to assess students from a variety of academic disciplines? Would you expect the retention rates to be comparable?

5. Were the urban students you studied more academically prepared (as stated in the paper) simply because a greater proportion had been admitted unconditionally? Does unconditional admission equate to academic preparation?

6. Is it appropriate to conclude that the courses students took in high school did not influence academic success in college when student enrollment in courses was not assessed as part of the study?

This paper reveals that high school location was of little practical significance in predicting the academic success of students in college. The study adds significantly to the body of knowledge in Agricultural Education.

A PROFILE OF EMPLOYMENT AND RELATED EXPERIENCES OF 1983 HIGH SCHOOL GRADUATES DESCRIBED WITHIN THE HIGH SCHOOL CURRICULUM CONCENTRATION OF THE GRADUATES

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INTRODUCTION

The National Commission on Secondary Vocational Education (1984) wrote the following about the status of secondary vocational education in the nation.

> Our society is obsessively concerned with higher education as a preparation for work and downgrades the intrinsic, lifelong value of education. Our secondary schools reflect this obsession by valuing only the college bound. Such a narrow focus ignores the fact that approximately 80% of the jobs in America do not require a college degree, and most students will not obtain one.
>
> This educational myopia that pervades our society produces predictable results.
>
> Many high school graduates cannot read, write, compute, or perform well enough to find meaningful work during or following high school.
>
> Many high school graduates, holding their unmarketable degrees, face disillusionment when their professional expectations collide with reality. They are unable to recognize the intrinsic value of their education or understand its relevance to their personal goals.
>
> High school vocational education is downgraded and assigned second-class status, especially trade and industrial programs. Some of the most successful programs, such as clerical and computer studies, are reluctantly listed as such. (p. 1-2)

Riesenberg and Stenberg (1990) reported vocational concentrators seemed to sacrifice academic preparation in high school to participate in vocational programs. These same vocational concentrators did not enjoy any advantage over non-vocational concentrators in terms of first time employment; an advantage that has often been a major selling point with vocational educators. To this end, Wirt (1991) indicated, "With regards to students who go to work full-time after graduating from high school, the NAVE found that the rate at which these young people are getting good jobs in the fields for which they are trained is generally low" (p. 429).

Wirt (1991) wrote further:

> The common perception is that the American public high school contains three tracks into which students are channeled ...
>
> The facts as we know them from carefully analyzing national samples of student transcripts contradicts this conventional view. ...

> The vast majority of vocational education taken by students who graduate from high school is taken by those who plan to go on for more education after high school. ... (p. 427)

In addition, a great deal of discussion in the 1980's has focused on the long term advantages or disadvantages (depending on one's point of view) for high school vocational concentrators verses academic and/or general concentrators in the labor market. According to Rosenstock (1991) "There is ample evidence that vocational students do not have higher job placement or wage rates than nonvocational students. And only 27% of all secondary students in the U.S. who major in a technical area ever work in a related field." (p. 434)

The need for more specific information about a more specific population (Idaho high school graduates) formed the basis for this study.

PURPOSE AND OBJECTIVES

The purpose of this study was to follow-up a sample of the 1983 Idaho high school graduates to describe those students' employment and related experiences 5 years after graduation from high school. The specific objectives of the study were to:

1. determine the curriculum concentration (vocational or non-vocational) selected by the graduates based on the type and number of credits completed in high school.

2. develop a profile of the 5 years after high school graduation employment status and related experiences of the graduates within each curriculum concentration.

3. develop a profile of the satisfaction of the employers of the graduates with selected aspects of employment preparation within each curriculum concentration.

PROCEDURES

This study was based on a descriptive survey. The major purpose of this study was to describe the sample on the variables identified in the objectives. Differences among the sample sub-groups were analyzed statistically in order to add information.

The target population of the study were all 1983 Idaho public high school graduates (12,130 graduates). The sample was selected using a stratified random, cluster, proportional sampling technique. Idaho high schools (121 schools) were stratified according to the state athletic classification schema for high school size. This included 5 divisions based on high school enrollment. From each strata, a proportional random sample of high schools were drawn (40 schools total). Class rosters of the 1983 graduates were solicited from each selected high school. Class rosters from each strata were proportionally and randomly sampled.

An initial sample of 2400 students was selected. Four of the initial 40 schools decided to not participate further when asked to provide transcripts. The remaining schools provided 2082 usable transcripts and 2112 usable student addresses. Of the 2112 questionnaires initially mailed, 787 were returned as undeliverable, primarily because the subjects had moved from the address supplied by the high school. Therefore, the sample of this study numbered 1381 students.

Data were collected using two different mail questionnaires: a graduate follow-up questionnaire and an employer follow-up questionnaire.

Of the 1381 graduates mailed a questionnaire, 730 responded with usable questionnaires for a response rate of 53 percent. Of the 730 responding graduates, 454 supplied usable names and addresses of employers; 317 employers returned usable questionnaires for a response rate of 70 percent. Because no telephone numbers existed in the sample data base, a telephone follow-up to the non-respondents was not possible, however, the early and late returns were compared on selected variables and no differences were found. For this study, it has been assumed the non-response source of error has been dealt with as adequately as possible.

The student follow-up questionnaire was designed to assess Idaho high school graduates as to their employment history, current employment situation, job satisfaction, employer name and address, and other pertinent information. Questionnaire items were created or modified as needed to answer the stated criterion questions. Questions were validated by a panel of judges deemed to be experts in the area of follow-up studies. A pilot test of the questionnaire was conducted using approximately 75 students enrolled in vocational technical programs at one of the postsecondary vocational-technical institutions.

The employer follow-up questionnaire was designed to obtain employers' rating of the high school graduates. Items from existing questionnaires were adapted and original items were developed to gather data from employers. As with the student follow-up, the employer follow-up was validated using a panel of experts. A pilot test of the instrument with 25 businessmen/women and employers was conducted prior to actual administration.

Data were summarized using descriptive statistics. Analyses for differences between curriculum concentrators were conducted using the SPSSx statistical programs: Reliability, Chi-square, Mann-Whitney *U* Test, Friedman, and Wilcoxon Matched-pairs Signed-ranks Test. In all cases, the alpha level for significance was set at 0.05.

The reliability coefficients (Cronbach's alpha) for the 4 subsets of interrelated Likert-type scaled variables used in this study were: satisfaction with selected current job characteristics, 0.8454; self-ratings on selected work habits and characteristics, 0.7352; employers' ratings on selected work habits and characteristics, 0.8917 and employers' rating on selected aspects of employment preparedness, 0.9145.

For the purposes of this study, vocational concentrators were defined as students who had invested ten (10) percent of their total high school credits in a specific occupational vocational area of study. Credits in courses defined as general labor market preparation (GLMP) and offered under the vocational education umbrella, such as personal typing, were not counted when determining the curriculum concentration.

RESULTS

OBJECTIVE 1

An analysis of the transcripts of the subjects of the study indicated 212 (29%) of the sample had completed 10 percent or more of their high school credits in one of the occupational vocational areas and were therefore classified as vocational concentrators, whereas, 519 (71%) were classified as non-vocational concentrators. Few students (11.7%) had taken no courses in vocational education, 26.5 percent, 1 to 3 credits, 25.6 percent, 4 to 6 credits, 17.8 percent, 7 to 9 credits, 11.3 percent, 10 to 12 credits and 7.1 percent had taken 13 credits or more of occupational vocational education.

OBJECTIVE 2

Slightly more than 24 percent of the non-vocational concentrators did not continue their education after graduation, whereas 30.9 percent of the vocational concentrators did not continue their education after high school. The non-vocational concentrators graduated from college at the rate of 31.8 percent, whereas only 12.1 percent of the vocational concentrators graduated from college. However, 20.3 percent of the vocational concentrators graduated from a post-secondary vocational school, while 9.8 percent of the non-vocational concentrators did likewise. Comparable percentages of non-vocational and vocational concentrators attended college, but did not graduate. The differences in graduation rates from post-secondary vocational school and college between the two groups of concentrators were statistically significant.

While the vocational concentrators reported a slightly higher employment rate 5 years after graduation (70.3% vs 66.7%) and the non-vocational concentrators reported a higher rate of self employment (6.1% vs 3.9%), perhaps the most noticeable difference was that 10.0 percent of the non-vocational concentrators and 7.5 percent of the vocational concentrators reported themselves as being neither employed nor as a student. The differences in employment status between the concentrator groups were not statistically significant.

The non-vocational concentrators reported significantly more jobs in the professional category (14.6% vs 7.5%), and the vocational concentrators reported significantly more jobs in the skilled crafts (7.5% vs 3.3%) and the operator (7.5% vs 4.8%) categories. No significant differences were found in the job categories of secretarial/clerical, managerial, service worker, technical, laborer, sales and teaching.

No significant differences were found in the reports of the graduates of the relationship of their current job to the job they had planned for in high school. Over 40 percent of the non-vocational concentrators and 33.8 percent of the vocational concentrators reported their jobs (5 years after graduation) were not related to their high school plans. And surprisingly, 16.8 percent of the non-vocational and 18.4 percent of the vocational concentrators reported they did not have plans for a job while in high school.

No significant differences were found in the graduates' reporting of whether they had received formal training for their current job: 44.3 percent of the non-vocational concentrators and 50.2 percent of the vocational concentrators. In addition, no significant differences were found in the graduates' reporting of whether they had been hired for their current job because of the formal training they had acquired.

No statistical significant differences were found between the non-vocational and vocational concentrators in their self-reported 1988 personal gross income.

Slightly more vocational concentrators were still working in Idaho (59.7%) than were the non-vocational concentrators (53.8%).

Significantly more non-vocational concentrators (89.4%) reported they liked and were satisfied with their job than did the vocational concentrators (80.9%).

The graduates were also asked to indicate their satisfaction with selected job characteristics using a rating scale of very satisfied, somewhat satisfied and not satisfied. On only one characteristic was there a significant difference in satisfaction - non-vocational concentrators were significantly more satisfied with the supervision and management they received than were the vocational concentrators. No significant differences were found in the satisfaction with the remaining characteristics of salary, fringe benefits, potential for advancement, co-workers, company policies and practices, pace (*speed*) of work, working conditions, variety of work tasks, job security and safety conditions.

In addition, the graduates were asked to rate themselves on the work habits and characteristics of integrity, dependability, responsibility, initiative, cooperation, leadership, attitude toward work, emotional stability, courtesy/friendliness and personal appearance using a scale of above average, average and below average. No significant differences in the ratings were found between the two groups.

OBJECTIVE 3

The study contacted the employer or supervisor identified by the 454 responding graduates; 220 of the non-vocational concentrators and 97 of the vocational concentrators were evaluated by their employer or supervisor.

The employers were asked to rate (above average, average and below average) the employee on the same work habits the graduates had rated themselves under *Objective 2*. No significant differences were found between the non-vocational and vocational concentrators' ratings on the aforementioned work habits and characteristics. When the ratings of the employers were used to statistically rank the work habits and characteristics, both the non-vocational and vocational concentrators were rated the highest on integrity and courtesy/friendliness and lowest on emotional stability and leadership.

When the non-vocational concentrators' ratings of themselves on the selected work habits and characteristics were compared to their employers' ratings, a significant difference in ratings occurred with the characteristic responsibility; the employers had rated the non-vocational concentrators higher than they had rated themselves. When the vocational concentrators' ratings of themselves on the selected work habits and characteristics were compared to their employers' ratings, a significant difference in ratings occurred with the characteristics dependability, responsibility and initiative; the employers had rated the vocational concentrators higher on the three characteristics than the vocational concentrators had rated themselves.

The employers were also asked to rate the employee (above average, average and below average) on the following aspects of job preparedness (How well was the employee prepared for their job at the time they started the job?): job know-how, quality of work, quantity of work, cooperativeness, safety, initiative, attendance, dependability, appearance, accepting advice and supervision, adaptability, use of tools and equipment and selection and care of space, materials and supplies. No significant differences were found between the ratings of the non-vocational and vocational concentrators on selected aspects of job preparedness by employers. Again, both groups were rated highest by their employers on the aspects of attendance and cooperativeness and lowest on the aspects of appearance and job know-how.

CONCLUSIONS

Based on the findings of the study the investigators have drawn the following conclusions:

1. Almost 30 percent of Idaho high school students graduating in the early 1980's could be classified as vocational concentrators; they completed 10 percent of their high school credits in a particular occupational vocational area of study.

2. Few Idaho high school graduates from the early 1980's had taken no courses in occupational vocational education.

3. While significantly fewer vocational concentrators graduated from college than did non-vocational concentrators, more vocational concentrators completed an associate degree and the percentage of vocational concentrators who attempted college but did not graduate was slightly less than for the non-vocational concentrators. More importantly, over 1/4 of the vocational concentrators did complete an associate or baccalaureate degree.

4. Neither non-vocational nor vocational concentrators enjoyed noteworthy advantages regarding employment and related aspects 5 years after graduation from high school. The differences that were found were mixed and were interesting, but did not add to an advantage for either group.

5. As was noted, surprisingly, 16.8 percent of the non-vocational and 18.4 percent of the vocational concentrators reported they had made no employment or job plans while in high school. This would seem to be a major disadvantage for both groups of graduates and should be a major concern to all high school educators and counselors alike.

6. Employers rated both groups of graduates equally average to above average on selected work habits and characteristics and selected aspects of job preparedness. Both groups were rated the highest on integrity and attendance and lowest on leadership and job know-how. The notoriety of our youth and their attendance as a work habit was not supported by this study. However, vocational educators tout leadership development as a mainstay of their programs; yet employers rated vocational concentrators the same as non-vocational concentrators. Furthermore, of all the characteristics vocational concentrators were rated on, leadership received the lowest rating.

IMPLICATIONS

The investigators perceived the following implications of the findings and conclusions of this study:

1. Since vocational concentrators were not at a significant disadvantage 5 years after graduation on any of the measures addressed in this study, perhaps the so-called vocational tract ought to be given the same stature as the non-vocational tract in our educational systems. And those students who are inclined to choose a vocational concentration should be

guided and encouraged rather than be assigned second-class status as noted by The National Commission on Secondary Vocational Education.

2. The apparent lack of disadvantages for the vocational concentrators may be a result of the often cited rationale that the philosophy and practices of vocational education are more suited to the learning styles of the vocational concentrators.
3. Further work needs to be done to determine the effect of curriculum concentration on employment and life later than 5 years after high school.

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A PROFILE OF EMPLOYMENT AND RELATED EXPERIENCES OF 1983 HIGH SCHOOL GRADUATES DESCRIBED WITHIN THE HIGH SCHOOL CURRICULUM CONCENTRATION OF THE GRADUATES

A Critique

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The focus of this study was directed toward a comparison of vocational and non-vocational graduates of Idaho high schools in 1983. Students and employers were surveyed to collect data for analysis. A review of student transcripts was conducted to classify students as vocational or non-vocational.

The introduction to the paper reported that vocational education has been relegated to second class status relative to academic programs. The objectives of the study indicated that profiles were to be developed for vocational and non-vocational graduates and their employers respectively. The purpose of the study was to determine if there was an advantage in terms of the employability of vocational graduates versus non-vocational graduates.

The following questions are offered in an attempt to clarify certain aspects of the study.

1. What was the profile of vocational graduates and non-vocational graduates that was referred to in objective two?
2. What was the profile of the satisfaction of employers of vocational and non-vocational graduates which was referred to in objective three?
3. Was the usable responses of 730 graduates of a sample of 2,400 students representative of 12,130 individuals in the population (the actual response rate was 30.4 percent)?
4. Was gender a factor in the percent of graduates who reported being neither employed or a student?
5. What was the rationale for not including tables in the paper to present the data and the results of the statistical analysis?

The research reported in this study adds important information to the body of knowledge regarding the function of vocational education in preparing students for employment. The following suggestions are offered for the consideration of the authors and other researchers. First, conclusions should reflect a synthesis of the results of the research rather than reinterating individual findings. Second, it is recommended that implications be stated in a positive manner.

This study provides evidence of the economic and social contribution of vocational education to the state of Idaho. The researchers should be commended for addressing the problem of vocational education's image with empirical data.

AGRICULTURAL EDUCATION GRADUATES: COMPARISONS OF ACADEMIC ABILITY AND TEACHER PREPARATION OF THOSE WHO TEACH AND THOSE WHO DO NOT

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INTRODUCTION/THEORETICAL FRAMEWORK

Issues of teacher competence and the quality of education provided by the public schools of America have always been major concerns of educators and teacher educators. In recent years, these issues have also received much public attention. In his report to the public entitled, A Nation at Risk, Gardner (1983) suggested that today's beginning teachers are not as well-qualified as those who previously entered teaching. Studies by Schlecty and Vance (1981), and Weaver (1984) suggested that the academic ability and/or quality of those choosing to enter and remain in teaching was on the decline.

The quality of agricultural education in the nation's secondary schools has also been under scrutiny. The National Research Council established the Committee on Agricultural Education in Secondary Schools. The committee's final report, Understanding Agriculture: New Directions for Education (National Academy Press, 1988) made specific recommendations to reform secondary school agricultural education programs. Among the recommendations were: "...securing more competent teachers" (p.34). The report further stated: "...quality teachers are the critical ingredient for quality programs" (p.34).

Wilson (1985) cited studies that suggested there is a relationship between teachers' academic ability and students' achievement. As research concerning teacher quality and student achievement continues, some disagreement still remains as to whether the academic ability of student teachers is a valid predictor of teaching quality. Olstad et al. (1987) suggest that: "While it [academic competency] may not be predictive of competence in teaching performance, perhaps it is a critical, minimum standard which all prospective teachers should meet..." (p.10). Sweeney (1987) stated that:

> While the possible negative effect on student achievement resulting from decline in quality of those entering and remaining in teaching is a major concern, the public relations problem that this creates for the teaching profession and the possible effect on the quality and quantity of those recruited into and retained in the profession is equally troublesome (p.2).

In recent years, considerable data have been collected in an attempt to determine the quality of teachers entering and remaining in the teaching profession (e.g., Schlecty & Vance, 1981; McCoy & Mortensen, 1983; Weaver, 1984; Pigge, 1985: Wardlow, 1986). All studies have used some measure of academic ability to ascertain the quality or potential quality of the teacher education graduate. Schlecty and Vance (1981) stated that:

> ...interest in [teacher's] academic ability stemmed from the generally accepted fact that persons who score well on measures of academic ability have educational and job opportunities available to them that are usually denied to those who score poorly. Thus it seemed reasonable to expect that teachers who scored well on measures of academic ability would be more likely to opt out of teaching than their lower scoring colleagues (p.107).

PURPOSE AND OBJECTIVES

The Agricultural Education and Studies Department at Iowa State University (ISU), like other agricultural education departments, fulfills its mission through teaching, research, extension, and service. One of the departmental goals is to conduct an undergraduate program to prepare students to be agricultural educators in secondary and post secondary schools, agricultural extension, and business and industry.

It is evident that an up-swing in the agricultural economy, coupled with developments in agricultural science and technology, have made many new jobs in business and industry available to agricultural education graduates at very competitive salaries. Camp and Echeverria (1989) reported the percentage of agricultural education graduates entering agricultural business occupations nationally increased from 13.8 percent in 1979-80 to 20.1 percent in 1987-88. That compared to 33.3 percent and 42.8 percent for Iowa during the same time period.

The purpose of this study was to analyze the characteristics of the recent Agricultural Education graduates at ISU completing a B.S. degree and their perceptions concerning the Teacher Education Program. The objectives for the study were: 1) compare the academic ability of those graduates from 1980-1989 who planned to teach and those not at time of graduation, and teachers and nonteachers one and five years following graduation; and 2) identify factors most influential in differentiating between graduates who entered the teaching field and those who did not.

PROCEDURES

The population for this research project consisted of graduates of the ISU Teacher Preparation Program who certified in the area of vocational agriculture from Spring 1980 through Spring 1989. The total number of graduates who certified to teach in this period was 294, which was the population and the sample for the study.

The primary data for this study were obtained from a data base which was part of a comprehensive on-going research project conducted by the Research Institute for Studies in Education (RISE) at Iowa State University. The research project followed the longitudinal survey-cohert studies design (Borg & Gall 1983) in which a specific population was followed over a period of time. It was designed for collection of data from the total population of teacher education students and graduates at major points in their preparation and careers. Collection points for purposes of this study included: 1) time of admission to the teacher education program; 2) graduation from the teacher education program; 3) one year following graduation; and 4) five years following graduation. Data collected provided information about attitudes, teacher competencies, personal characteristics, and planned and actual career paths.

Three survey instruments developed by RISE personnel were used to collect the data. Instruments were validated and field tested before use. Cronbrach's alpha reliability coefficients were computed and ranged from .63 to .94. The scores were judged to be satisfactory. Data were collected by mail. Follow-up procedures outlined by Dillman (1978) were used. Response rates ranged from 55.1 percent at graduation, to 48.0 percent one year after graduation, to 49.7 percent five years after graduation. Students' permanent record cards were also used to obtain high school ranking (HSR), American College Test scores (ACT), grade point averages at time of admittance to Teacher Education Program (AGPA), and grade point averages at time of graduation from Teacher Education Program (GGPA) for all graduates. Inferential statistics were used because current forwarding addresses were not available at each data collection point for all graduates. Nonresponse bias was checked and found to be nonexistent by comparing respondents and nonrespondents on the four measures of academic ability.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS-X). Statistical procedures included T-TEST, ONEWAY, ANOVA, CORRELATIONS, DISCRIMINANT, AND CHI-SQUARE. The level of significance for all procedures was set a priori at the .05 level.

Table 1. Comparison of graduates between 1980 and 1989 on four measures of academic ability

Measure[a]/ Sample	N	Mean	S.D.	F-Ratio	F-prob
ACT					
Grad.- 80/83	62	23.73	3.77	1.97	.1440
Grad.- 84/86	39	22.10	4.39		
Grad.- 87/89	21	23.38	4.18		
GGPA					
Grad.- 80/83	84	2.91	.36	2.42	.0920
Grad.- 84/86	49	2.92	.39		
Grad.- 87/89	29	3.09	.47		
AGPA					
Grad.- 80/83	41	2.79	.49	2.03	.1365
Grad.- 84/86	49	2.69	.46		
Grad.- 87/89	29	2.92	.52		
HSR					
Grad.- 80/83	68	23.57	17.91	1.73	.1814
Grad.- 84/86	40	29.95	19.01		
Grad.- 87/89	23	29.43	22.24		

[a]ACT = American Collegiate Test Score
GGPA = Grade point average at graduation
AGPA = Grade point average at admission to teacher education
HSR = Rank in high school graduating class

RESULTS

The first objective was to compare the academic ability of graduates from 1980-1989, those planning to teach and those not at the time of graduation, and teachers and nonteachers one and five years following graduation. As shown in Table 1, there were no significant differences among the three groups when divided by years of graduation on any of the four measures of academic ability. Table 2 contains data from graduates who planned to teach and those who did not at the time of graduation. Graduates who were unavailable for employment were not included in this analysis. As shown, there were no significant differences between the groups on the four measures of academic ability.

Table 2. Comparison of graduates who planned to teach and those not on measures of academic ability at graduation

Measure/ Group	N	Mean	S.D.	T-Value	2-tail prob.
ACT					
Plan to teach	61	23.59	3.86	1.16	0.248
Plan not to teach	54	22.72	4.11		
GGPA					
Plan to teach	83	2.88	.36	-1.84	0.068
Plan not to teach	71	2.99	.42		
AGPA					
Plan to teach	56	2.72	.43	-1.40	0.163
Plan not to teach	55	2.81	.52		
HSR					
Plan to teach	65	29.77	20.38	1.85	0.066
Plan not to teach	58	23.40	17.38		

Presented in Table 3 are data from graduates at one and five years following graduation. Only one significant difference emerged. Graduates not teaching one year following graduation had a significantly higher GPA at time of admission to the teacher education program (AGPA) than did teachers. At one year following graduation, no significant difference was found between the two groups on ACT, GGPA, or HSR. No significant difference was found between the two groups at five years on any of the four measures of academic ability.

The second objective of the study was to identify factors most influential in differentiating between the graduates who entered the teaching field and those who did not. Presented in Table 4 is a list of 18 predictor variables used in the discriminant analysis function. Three were related to academic ability; four were composite scores in areas of the adequacy of graduates' professional teacher preparation; six were factors of importance to them in accepting their current job; four were related to the opportunities their current job provided; and the final factor was graduates' response to would you prepare to be a teacher again. DISCRIMINANT calculated a discriminant function that best distinguished between the criterion variables (teachers and nonteachers) using the combined effect of the mean scores of all predictor variables. The difference in the mean scores of the function for each group was tested using Wilks' Lambda and a significant difference was found (Wilks' Lambda = 5465: significance = .0004).

Table 3. Comparison of teachers and nonteachers on measures of academic ability one and five years after graduation

Measure/ Group	N	Mean	S.D.	T-Value	2-tail prob.
One Year:					
Act					
Teachers	60	23.43	3.80	0.26	0.796
Nonteachers	51	23.24	4.26		
GGPA					
Teachers	76	2.90	.35	-1.56	0.121
Nonteachers	65	3.00	.42		
AGPA					
Teachers	76	2.66	.40	-2.02	0.045
Nonteachers	65	2.81	.48		
HSR					
Teachers	65	25.96	18.24	1.01	0.313
Nonteachers	53	22.58	17.62		
Five Years:					
Act					
Teachers	23	24.22	3.91	1.076	0.287
Nonteachers	51	23.06	4.46		
GGPA					
Teachers	31	2.94	.31	0.070	0.942
Nonteachers	64	2.94	.44		
AGPA					
Teachers	31	2.71	.34	0.51	0.508
Nonteachers	64	2.77	.50		
HSR					
Teachers	27	21.81	17.35	-0.46	0.650
Nonteachers	54	23.74	18.20		

Presented in Table 4 are the correlation coefficients (in rank order) which describe the relationship between each predictor variable and the discriminating function. Koenker (1971) suggested the following rule of thumb for the degree of relationship between variables to be: .80 to 1.00 highly related, .60 to .79 moderate to marked relationship, .40 to .59 fair degree of relationship, .20 to .39 slight, and .00 to .19 only a negligible or no relationship. As shown, graduates' rating of the extent current job provided prestige money, benefits and chances for advancement was the predictor variable having the highest degree of relationship. The variables related to academic ability and adequacy of teacher preparation had only a slight relationship.

The DISCRIMINANT procedure was also used to classify each graduate included in the original discriminant analysis based upon the individual's discriminant score. This classification was then compared to graduate's actual classification. As shown in Table 5, the discriminant function equation was able to accurately classify 81.40 percent of the cases.

Table 4. Factors most influential in differentiating between teachers and nonteachers one year following graduation

Factor	Discriminant correlation coefficient (r)
Extent current job provides prestige, money, benefits, and advancement	.4500
Importance of salary offered	.3052
Importance of reputation of organization	.3027
Test and evaluate students	.2508
Plan and deliver instruction	.2210
GGPA	.2138
Interpersonal relationships	.2038
Importance of location of job	-.1812
Importance - liked people in interview	.1476
HSR	-.1474
Extent current job provide opportunities for challenge and to exercise leadership	.1245
Extent current job provides opportunities to help and serve others and work with people vs. things	-.1097
Importance of size of organization	.0949
Assess and deal with learning problems	.0900
Extent current job provides opportunities to be creative and use abilities and aptitudes	-.0741
ACT	.0693
Would you prepare to be a teacher again	-.0544
Importance of type of position	.0529

Table 5. Discriminant analysis classification results one year following graduation

		Predicted group membership[a]	
Actual group	No. of cases	Teachers	Nonteachers
Teachers	52	43 82.7%	9 17.3%
Nonteachers	34	7 20.6%	27 79.4%

[a] Percent of grouped cases correctly classified = 81.40%

CONCLUSIONS AND RECOMMENDATIONS

Based on the results and findings of this study, the following conclusions were drawn. There are no appreciable differences in the academic abilities of ISU agricultural education graduates. The study found no significant declines in the academic ability of the students who graduated between 1980 and 1989 when grouped by years of graduation. With graduates teaching after one year, only one significant difference emerged. The group mean GPA at the time they were admitted to the teacher education program (AGPA) was significantly higher for the group not teaching after one year. No significant differences were shown between those teaching and those not after one year on GGPA, HSR, or ACT. The study found no significant differences between teachers and nonteachers five years after graduation on AGPA, GGPA, HSR, or ACT. According to these findings, those graduates who chose to teach agriculture are just as academically able as their fellow graduates who seek other types of employment.

These findings concur with similar studies in agricultural education by McCoy and Mortensen (1984) and Wardlow (1986). This research is in conflict with the findings of Schlecty and Vance (1981; 1982) who assert that potential teachers and practicing teachers who score the highest on measures of academic ability are drawn away from the teaching profession. The Schlecty and Vance (1981; 1982) studies were based on samples of teachers in several different subject areas of teacher certification.

Although cause and effect are not implied, individual differences on measures of academic ability or adequacy of preparation in professional teacher education do not significantly contribute to the discriminate function equations that differentiate between graduates who are teaching and those not one year following graduation. Graduates who chose not to teach seemed to be drawn to other occupations seeking greater extrinsic rewards, personal goals, advancement opportunities, and higher salaries. We are not losing graduates from the agricultural education curriculum with the highest academic ability to nonteaching careers as we may have been lead to believe.

The following recommendations are given:

1) The profession, state and local school administration, and the general public should be informed that agricultural education graduates who enter teaching are equal in academic ability and level of professional teacher preparation as those who do not teach or leave teaching.

2) State and local school administration and the general public should be informed that steps should be taken to improve extrinsic rewards associated with teaching agriculture at the secondary level in order to maintain an adequate supply of graduates desiring to enter the teaching profession.

3) Similar studies should be conducted within other states to determine if national or regional trends or norms are emerging.

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AGRICULTURAL EDUCATION GRADUATES: COMPARISONS OF ACADEMIC ABILITY AND TEACHER PREPARATION OF THOSE WHO TEACH AND THOSE WHO DO NOT

A Critique

Robert J. Birkenholz, University of Missouri — Discussant

The researchers should be commended for seeking to provide empirical evidence regarding the academic ability of Agricultural Education graduates relative to the decision to enter and remain in teaching. An excellent theoretical framework was presented which identified contextual factors related to practical and perceptual problems related to the academic competence of teachers in this country.

The paper was well-written and outlined the purpose and objectives for the study. The procedures for data collection and analysis were described in relation to the objectives of the study. The results were presented in the text and tables which complimented one another. The Conclusions and Recommendations section appropriately presented the results of this study in the context of previous research. Specific recommendations were offered which were linked to the findings presented in the paper.

The following questions are offered in an attempt to clarify certain aspects of the study.

1. Were you able to identify factors which were "most influential" in differentiating between respondent groups as was proposed in objective number two?
2. What procedures were used to validate and field test the data collection instruments?
3. What assurance do you have that a 50 percent response rate adequately represents the population?
4. How does a lack of current addresses justify the use of inferential statistics?
5. Is it appropriate to conclude that non-response bias is "non-existant" based on a comparison of the four measures of academic ability?
6. How many factors were utilized in the discriminant analysis classification reported in Table 5?

The results of this study provide empirical evidence of the academic ability of Agricultural Education graduates at Iowa State. Further research is recommended to compare the academic abilities of such graduates with students in other agriculture majors.

RELATIONSHIPS BETWEEN PERSONAL, FAMILY, AND EXTENSION POSITION CHARACTERISTICS AND SELF-PERCEIVED EFFECTIVENESS OF PROFESSIONAL EXTENSION 4-H EDUCATORS

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INTRODUCTION

The role of the professional extension 4-H educator is to plan, conduct, and evaluate non-formal, experiential educational programs intended to develop skills and knowledge in youth. Although the professional 4-H educators often work directly with youth, their efforts are aided by volunteer leaders, parents, and other adults who organize and conduct educational project experiences. Those adults should be trained to teach and meet the needs of youth by professional extension 4-H educators.

When an extension 4-H educator is performing effectively, the expected outcome is improvement of skills and knowledge in the educator's adult and youth clientele. Reviews of teacher effectiveness research have reported that teacher behaviors can be linked to student achievement (Kash and Borich, 1982; Medley, 1979). Distinguishing behaviors and characteristics of the effective vocational agriculture teacher were profiled by Miller, Kahler, and Rheault (1989), who classified those behaviors into five educator performance areas: productive teaching techniques, structured class management, positive interpersonal relationships, professional responsibilities, and personal characteristics. Similar behaviors may also be exhibited by effective extension 4-H educators.

Changes in the structures of families and the personal lives of their members have been occurring in the United States during the past twenty years, and are likely to have occurred in the lives of extension 4-H educators, as well as the clientele they serve. Among the changes which have occurred are increases in numbers of working women, especially parents, the divorce rate, numbers of single parent families, and the age of the population (Masnick & Bane, 1980; Englebrecht & Nies, 1988). The number of married couples whose members maintain separate residences to pursue separate careers has also increased (Voydanoff, 1985). The Cooperative Extension System Strategic Planning Council (1991) reported that working parents and single parents have less time to care for children. It stated that their preschool children need need care while they work, their school-aged children need before and after school care, and that schools are assuming parenting responsibilities once reserved for parents and churches. It also stated that, although two-thirds of U. S. families include two parents and one or more children under 18, a majority of those families are step-families, rather than families including both birth parents.

Thirteen personal life factors which teachers viewed as affecting their professional performance were identified by Pajak and Blase (1989). These included being a parent, marriage, single status, personal traits and interests, spiritual beliefs, extended family and friends, finances, health, and others.

Role conflict exists when there is a disruptive relationship between an educator's personal and professional lives (Burden, 1982). When a job absorbs almost all of a person's time, a harmful effect spills over on families because the person is unable to participate in family events, while trouble at home often means trouble at work (Hawkins, 1982). St. Pierre (1984) studied the ways in which extension work affects extension agents' family lives, how satisfied agents were with their jobs, and how those perceptions varied by type of agent and agents' stages in the family cycle. by conducting in-depth interviews with extension personnel in Pennsylvania. She concluded that extension work affected the quality of family life of extension personnel more negatively than positively. Hours of work which invaded time normally reserved for personal and family life were cited as a problem, especially for 4-H agents because educational events and activities were frequently conducted on evenings, weekends, and in the summers to accommodate the school and work schedules of their adult and youth clientele..

Stresses associated with changing work environments may also have an impact upon 4-H educator effectiveness. Along with other changes taking place in personal lives and families in society have come changes in the way cooperative extension conducts programming. In the mid-to-late 1980's extension clientele, decisionmakers, potential audiences, cooperators, other agencies, and universities were consulted to learn what organizational changes were needed to deliver quality educational programs to people in the 1990's. Extension organizations were restructured and resources were reallocated in all states,.and extension personnel were asked to assume some additional or different responsibilities. Extension organizations across the United States adopted strategic planning processes to focus programming on dealing with critical issues affecting agriculture and society (Cooperative Extension System Strategic Planning Council, 1991).

PURPOSE AND OBJECTIVES

The purpose of this study was to determine if effectiveness of educators who deliver extension 4-H programs is influenced by their personal or family characteristics or characteristics.of their positions with cooperative extension. The objectives of this study were to determine:

1. the personal, family, and extension position characteristics of extension 4-H educators
2. the self-perceived effectiveness of professional extension 4-H educators
3. if relationships exist between personal, family, and position characteristics and self-perceived effectiveness of professional extension 4-H educators.

PROCEDURES

The descriptive correlational survey method was used to study the target population of professional extension 4-H educators in the United States, including county, multi-county, district, and regional-based extension agents and state extension faculty and staff with 4-H responsibilities. A stratified random sample was drawn from the target population. Eight states were selected for survey, including two states which were selected at random from each of the four Agricultural Experiment Station regions. States surveyed were Rhode Island, New Hampshire, Kentucky, Wisconsin, Minnesota, Idaho, and Washington. For each state, extension personnel to receive surveys were selected at random from the state's January, 1990 membership of the National Association of Extension 4-H Agents. A total of 208 out of 450 extension personnel in those states were surveyed to assure a sample size with a 5% margin of error with a 5% risk of drawing a nonrepresentative sample (Krejcie & Morgan, 1970).

Data were collected using a mail questionnaire with thirty statements intended to measure self-reported behaviors related to educator effectiveness and twenty questions related to the educator's extension responsibilities and personal and family characteristics. The statements related to effectiveness were adapted for use with extension educators from questionnaires used by Miller, Kahler, and Rheault (1989) to measure effectiveness of vocational agriculture teachers. A Likert scale with anchors between 1 (never) and 9 (always) was used for responses related to effectiveness. The statements were subcategorized into five educator performance areas, including productive teaching behaviors (PTB), positive interpersonal relationships (PIR), professional responsibilities (PR), personal characteristics behavior (PCB), and organized, structured class management (OSCM). Sums of the responses were calculated to measure overall effectiveness and effectiveness in each of the five educator performance areas.

Face and content validity of the survey instrument were established by a panel of experts including six faculty in the Department of Agricultural and Extension Education. Reliability of the instrument was evaluated by calculating Cronbach's alpha using data collected from the sample.

The survey instrument, a cover letter, and a stamped, self addressed envelop were mailed on June 6, 1990. A follow-up letter and copy of the questionnaire were mailed to non-respondents at the end of three weeks. T-tests for major variables were used to compare responses of early and late respondents to determine if responses of the groups differed.

The Statistical Package for the Social Sciences ($SPSS^x$) was used to analyze data. Overall effectiveness and effectiveness in the five educator performance areas were calculated by determining the sum of responses in each category. Statistical analyses of data included calculation of frequencies, means, and standard deviations for each statement and effectiveness category. Pearson product moment correlations were calculated to measure relationships between variables. Analyses of variance were used to determine if differences between groups of educators existed. Means were compared using Scheffe's test.

RESULTS AND FINDINGS

A total of 160, or 77%, of the questionnaires were returned. One-hundred eighteen early responses and 42 late responses were received. No differences between the two groups ($p>.05$) were observed for key variables included in the study.

Cronbach's alpha for the overall effectiveness portion of the survey instrument was .91, indicating good reliability. The educator performance area subscales had Cronbach's alpha values of .83 for productive teaching behaviors (PTB), .74 for personal characteristics behavior (PCB), .71 for organized, structured class management (OSCM), .67 for positive interpersonal relationships (PIR), and .66 for professional responsibilities (PR).

Females comprised 54% of the respondents. The average age of the respondents was 39 years. Nearly all were white (97%). Fifty-nine percent held master's degrees as their highest degree earned, while 32% held bachelor's degrees and 7% held doctorates. Major areas of study for those degrees were agriculture (30%), education (19%), home economics (19%), and other majors (23%).

About two thirds (67%) of the educators were married, while 8% were divorced, and 22% had never married. Only 3% of the married respondents maintained residences separate from their spouses in order to keep their jobs. Seventy-one percent owned or were buying their homes. Twenty-three percent had children aged 5 or less, while 31% had children aged 6 to 18 years. Spouses or partners were not present in the homes of 25% of the respondents, while 51% had spouses or partners who were employed full-time and 11% had spouses who were employed part-time.

Forty-one percent of the educators reported that they had children between one month and 14 years of age. Of those individuals, 26% reported that their spouses cared for their children while they worked, 24% reported that non-relatives or day care homes cared for their children, and 17% reported that their children cared for themselves. In addition, 11% reported that relatives cared for their children, 9% reported that day care centers cared for their children, and 4% had private sitters care for their children in their homes.

Only 8% of the educators had "breadwinner" families in which only one parent of children aged 18 or younger was employed or self-employed. Thirty-nine percent had families in which both parents had careers, 11% had families which one parent was career or profession-oriented, while the other parent worked mainly to supplement income, 4% had single parent families, and 43% were not parents of children aged 18 or younger.

The mean number of years that respondents had worked for the cooperative extension organization in their current state was eleven. The primary area of responsibility for the majority of respondents (89%) was 4-H. Fifty-two percent did not have a secondary area of responsibility. Geographic areas of extension responsibility were single counties (75%), multi-county areas (9%;), and entire states (16%). Almost all (90%) of the educators were responsible for supervising extension volunteers, but only 32% were responsible for supervising other extension personnel. Salaries were provided by a combination of state and county funds for 71% of the educators, while 16% had entirely state-funded and 1% had entirely county-funded salaries.

Table 1
Means and Standard Deviations of Responses to Statements Measuring Behaviors Related to Effectiveness

Educator Performance Area	M*	SD
Productive Teaching Behaviors	7.16	.86
Positive Interpersonal Relationships	7.55	.79
Professional Responsibilities	7.31	.88
Personal Characteristics Behavior	7.44	.91
Organized, Structured Class Management	7.18	.93
Overall Effectiveness	7.34	.71

* 1 = Never; 9 = Always

Mean responses to the questions related to educator behavior related to effectiveness are in Table 1. With 9 corresponding to "always" and 1 corresponding to "never", the overall mean and standard deviation of the responses to the thirty statements measuring self-perceived overall effectiveness was 7.34 ± .71. Means and standard deviations of responses for the five educator behavior areas related to effectiveness range between 7.16 ± .86 for PTB and 7.55 ± .79 for PIR, indicating that the educators perceived that they were displaying effective behavior most of the time.

Table 2
Pearson Correlations Between Personal and Family Characteristics and Self-Perceived Behaviors Indicating Effectiveness of 4-H Extension Educators

Characteristic	r
Highest level of education	.28*
Age	.21*
Major	-.20*
State Cooperative Extension	.15
Gender	.08
Source of salary funding	.08
Marital status	-.05

* p<.05

Pearson Correlation Coefficients indicating relationships between personal characteristics and behaviors associated with educator effectiveness are presented in Table 2. Personal characteristics affecting educator effectiveness were age and highest degree completed (p<.05). Although it was low, a positive relationship between overall educator effectiveness and respondent's age (r=.21) was detected. Extension educators older than 39 years perceived themselves to be more effective educators than educators aged 39 years and younger (p<.01). The mean response of persons with degrees higher than a bachelors degree was 7.43 ± .66 compared with a response of 7.10 ± .73 for persons with a bachelors degree or less, indicating that persons with degrees higher than a bachelors degree perceived themselves to be more effective than persons with a bachelors degree or less ($p<.01$). Effectiveness did not differ with gender or major in which the highest degree was earned ($p>.05$).

Effectiveness of educators who were parents of children under age 18 was not related ($p>.05$) to whether the family had only one or both spouses employed or was a single parent family. Effectiveness was also not related ($p>.05$) to whether or not it was necessary for spouses to maintain separate residences in order to keep their jobs.

A low relationship between effectiveness and years employed by cooperative extension in any state was reported ($r=.21$). Educators with extension responsibilities covering an entire state were more effective ($p<.05$) than educators with responsibilities in multi-county or single county geographic areas. Effectiveness was not influenced by primary or secondary areas of position responsibility, source of salary funding, or having responsibilities for supervising other employees or volunteers.

CONCLUSIONS AND RECOMMENDATIONS

Many of the changes in families and personal lives which have occurred in society in general over the past twenty years have also occurred in the families and lives of extension 4-H educators. Many families of extension 4-H educators did not have children present, and a majority of the families with children had mothers who were employed.

Extension 4-H personnel perceived themselves to be effective educators when the educators' use of behaviors known to have a positive impact on student performance was used to define effectiveness. The behaviors associated with effectiveness did not differ with most of the characteristics of the extension positions and factors related to the personal and family lives of the educators. Changes in the personal and family makeup of the educators' clientele might make it necessary to change the way in which extension 4-H programs are delivered. Future study is needed to determine if changes in the personal and family characteristics of the 4-H educator's adult and youth clientele are occurring which would make changes in educator behavior and 4-H delivery methods necessary.

The higher degrees of effective behaviors reported in older and more highly educated 4-H educators and educators with state, rather than county, areas of responsibility suggest that effectiveness improves with experience and education. Extension organizations may be able to improve the effectiveness of their extension personnel by providing sabbatical leaves for pursuing additional education and in-service education focused upon techniques and behaviors which improve effectiveness.

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RELATIONSHIPS BETWEEN PERSONAL, FAMILY, AND EXTENSION POSITION CHARACTERISTICS AND SELF-PERCEIVED EFFECTIVENESS OF PROFESSIONAL EXTENSION 4-H EDUCATORS

A Critique

Larry E. Miller, Ohio State University -- Discussant

The authors do a masterful job of tying societal developments into their theoretical framework and the ultimate problem for the study. The objectives and procedures of the study are carefully outlined in a clear and concise manner. The problem is certainly one which should be studied in my estimation.

I did not understand how a nine-point Likert-type scale ranging from 1 (never) to (9) frequently measures self-perceived effectiveness. It would seem to me that this is an anchored scale instead of a Likert-type scale, and that frequency is not a measure of self-perceived effectiveness. Greater clarity is needed in this regard.

I believe that Table 1 should carefully note that "self-perceptions" are measured and not actual behaviors. I do not understand how Pearson product moment correlation coefficients were used in Table 2 when several of the characteristics listed are nominal in measurement scale. Is this an error in analysis or in reporting which analysis was used? The authors might have also found it beneficial to report what protocol they were following in describing the magnitude of correlation, e.g., what determines that a .28 is low and not negligible?

The conclusions of the study could have been greatly enhanced had the authors used another surrogate for behavior such as the state's performance appraisal measure for the agents. It would be interesting to observe the relationship between self-perceived effectiveness and the standardized performance appraisal scores of the agents, and also to see the appraisal scores in the overall analysis. One could always say this about any study where behavior is the desired outcome, however. Since the authors did not measure the relationship between "effectiveness" and leaves, I had some difficulty in their conclusion that this should be instituted by the states.

COMPETENCY, COPING, AND CONTRIBUTORY LIFE SKILLS DEVELOPMENT OF EIGHTH GRADE YOUTH

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INTRODUCTION

The mission of the Cooperative Extension System in conducting 4-H programs is to assist youth in acquiring knowledge, developing life skills, and forming attitudes which will enable them to become self-directing, productive and contributing members of society (ES-USDA, 1990). The objectives of the 4-H program have been categorized into three major "life skills" areas: 1) competency--developing knowledge and subject matter skills, 2) coping--dealing with stresses, and 3) contributory--increasing social skills which allow self and others to overcome situational and/or personal barriers (USDA, 1986; Weatherford & Weatherford, 1987).

In the early 1900s the major emphasis of 4-H programs was the teaching of production agriculture and home economics skills. Although learning technical subject matter is still an important part of the 4-H program, it has evolved to include an emphasis on developing the total individual, or the formation of broader skills that help youth cope with a changing world that is full of new social pressures (Lang & Gerwig, 1989).

However, in their review of experiential education, Weatherford and Weatherford (1987) conducted an analysis of the limited number of 4-H studies available and indicated that, "There appeared to be considerable research in the 4-H program within the coping domain. Some research was found under the competency domain, and the least amount of research was found within the contributory domain" (p. 21).

Excluded from the Weatherford and Weatherford analysis were several recent studies which more directly addressed the life skills development of 4-H participants (Hanna, 1988; Waguespack, 1988; Ladewig & Thomas, 1987; Schlutt, 1987, Heinsohn & Cantrell, 1986; Collins, 1984; Mueller, 1989). They found that 4-H has a positive influence, to varying degrees, on the life skills development of program participants.

The ultimate test of the value of a program like 4-H is in its impact on adolescents' development into competent, productive, and satisfied adults (Hamilton, 1981). Though the literature suggests that the overall impression of 4-H is favorable, little is known concerning the relative effectiveness of 4-H educational programs, particularly with younger members.Research related to the development of life skills in 4-H early adolescent members is limited, with the majority focused on members in late adolescence or on program alumni. Furthermore, few studies have compared 4-H and non-4-H participants.

PURPOSE AND OBJECTIVES

The primary purpose of this study was to examine the self-perceived competency, coping, and contributory life skills development of 8th grade students enrolled in Ohio public schools. The objectives of the study were to determine:

1. The extent to which 8th graders enrolled in Ohio public schools perceive they have developed competency, coping, and contributory life skills.
2. If significant differences exist between 4-H and non-4-H members' self-perceived development of competency, coping, and contributory life skills.
3. Which variables explain the self-perceived development of competency, coping, and contributory life skills of 8th grade youth enrolled in Ohio public schools.

PROCEDURES

This study utilized a descriptive correlational research design with the scope limited to 8th grade students enrolled in Ohio public schools. The Campbell and Stanley (1966) one-shot case study design was used in conducting the investigation.

A three-part questionnaire was used to collect data for the study. Section one of the instrument elicited data relative to the self-perceived development of competency, coping, and contributory life skills. The Life Skills Development Instrument (LSDI) developed by Waguespack (1988) was utilized to collect data relative to these three constructs. The instrument yielded Cronbach's reliability coefficients ranging from .80 - .87 for the three life skills scales.

Section two of the questionnaire collected data relative to students' demographic characteristics. The Rosenberg Self-Esteem Scale (Crandall, 1973) was used to assess the self-esteem of the subjects (alpha=92). Section three of the instrument elicited data concerning students' involvement in youth clubs and organization involvement of current and former 4-H members. This section was modeled after instrumentation used in the National 4-H Impact Study (Schlutt, 1987; Steele, 1989) and an Ohio 4-H dropout study (Nickles, 1989).

The survey instruments were reviewed by a panel of 12 Ohio 4-H district and state specialists to ensure content and face validity. Since the LSDI had not been previously used with 8th grade students, it was pilot tested in a county not selected for the study (Cronbach's alpha ranged from .80 - .87).

The population for the study included all 8th grade students enrolled in the Ohio Public School System in 1989-90. Allowing for a sampling error of 5% and risk factor of 1%, the needed sample size was 666 students (Krejcie & Morgan, 1970). To obtain the desired sample size, a multi-stage, random cluster sampling technique was used.

Three counties from each of the five Ohio Cooperative Extension (OCES, 1989) Districts were randomly selected. One public school system from each of the 15 counties (Ohio Department of Education, 1989) was randomly selected for the survey. Two schools had more than 50 8th graders, so two intact health classes were selected in each case. The research instruments were administered to the students by the researchers between April 25 and May 7, 1990. A total of 735 questionnaires were completed by the students, with 709 being usable. All students recorded their answers on optical scan sheets which were processed at the University Testing Services of The Pennsylvania State University.

ANALYSIS OF DATA

Two index values were computed for each subject based upon their participation in 4-H and other youth clubs. Those respondents who indicated they had never been a 4-H member or had no membership in other youth clubs were assigned index values of 0.00.

All nominally scaled independent variables were collapsed into two levels and "dummy coded" to compute multiple regression models. None of the variables tested for interactive effects were significantly related to any of the life skills scales (p .05), thus those first-order interactions were deleted from future regression equations.

RESULTS

Eighth Graders' Level of Life Skills Development

On a seven point Likert-type scale, most of the 8th grade youth perceived themselves as having developed medium to high levels of competency, coping, and contributory life skills. Comparisons can be drawn between how 11th and 12th grade Louisiana 4-H members perceived their development of competency, coping, and contributory life skills as compared to the 8th graders in Ohio (Table 1). The respondents in the Louisiana study (Waguespack, 1988) rated themselves only slightly higher on each of the life skills development scales.

Table 1 - A Comparison of the Life Skills Development of Louisiana and Ohio Youth

	Louisiana Study* (n=531)		Ohio Study (n=709)	
Scale	Mean**	SD	Mean**	SD
Competency	5.65	.62	5.51	.70
Coping	5.80	.64	5.66	.72
Contributory	5.53	.74	5.23	.88

*(Waguespack, 1988)
**Values could range from 1.0=strongly disagree to 7.0=strongly agree

One can only speculate as to why the mean values from the two studies were so similar; however, there are at least two plausible explanations. Since they are still developing their intellectual capacities, the 8th graders may have a somewhat unrealistic view of their skills and abilities and tend to rate themselves higher than what is realistic. The 11th and 12th graders who are in the later phases of adolescence may more realistically evaluate their abilities due to maturity and a wider range of life experiences. The second explanation could be that both groups of students were responding in a manner they perceived to be socially acceptable.

Differences Between 4-H and non-4-H Participants

Table 2 shows the mean scores for the 4-H and non-4-H participants' self-rated life skills development. There were no significant differences in the self-perceived level of competency, coping and contributory life skills for 4-H and non-4-H participants (Table 3). The literature contains citings where differences were noted between 4-H and non-4-H participants. However, those studies were conducted with older youth and program alumni, so differences in the life skills development of individuals attributable to 4-H or other club involvement may not appear until individuals are older and have had more opportunities for a variety of life experiences.

Table 2 - Self-Perceived Life Skills Mean Scores for the Respondents

	4-H Participants (n =239)		Non 4-H (n= 470)	
Scale	Mean	SD	Mean	SD
Competency	5.54	.74	5.50	.70
Coping	5.69	.75	5.66	.72
Contributory	5.24	.96	5.23	.88

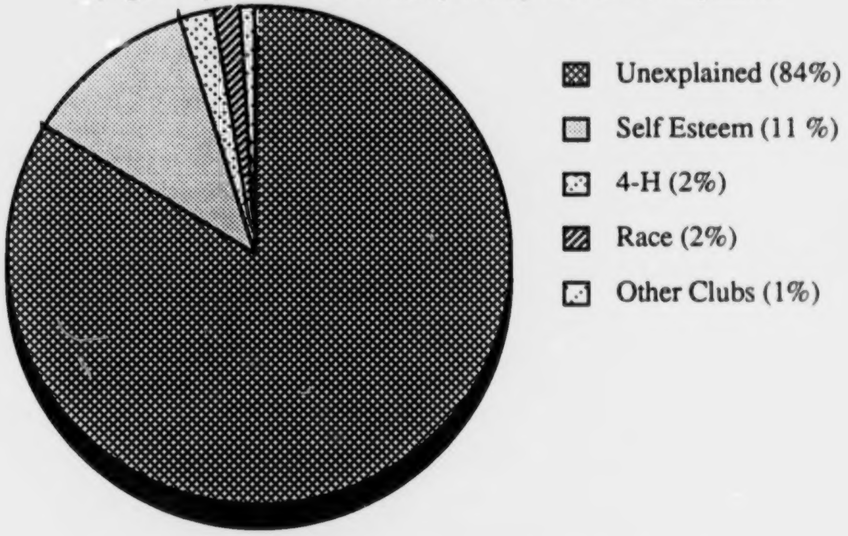
Table 3 - Differences in Self-Perceived Life Skills Development for 4-H and Non-4-H Participants

Scale	df	t-value	Probability
Competency	579	.66	.51
Coping	623	.43	.67
Contributory	659	.13	.89

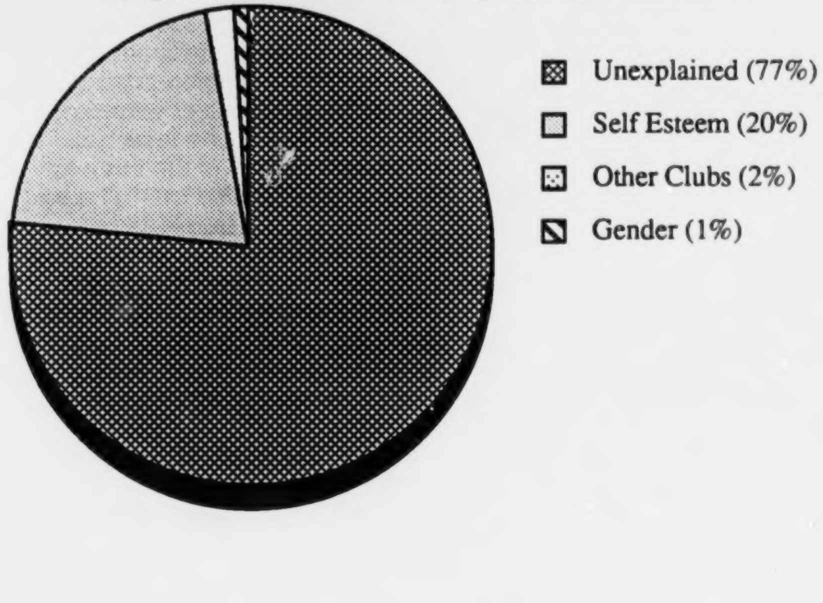
Variables Explaining the Variation in 8th Grade Youth's Life Skills Development

The respondents' level of self-esteem, as measured by the Rosenberg Self-Esteem Scale, provided the single best explanation for the variability in the competency, coping, and contributory life skills scores (Figures 1,2,& 3). Participation in other youth clubs also explained a portion of the variability in Ohio 8th grade youth's competency, coping and contributory life skills development. Race of the respondents and the level of 4-H participation explained another small percentage of the variance in the competency and contributory life skills.

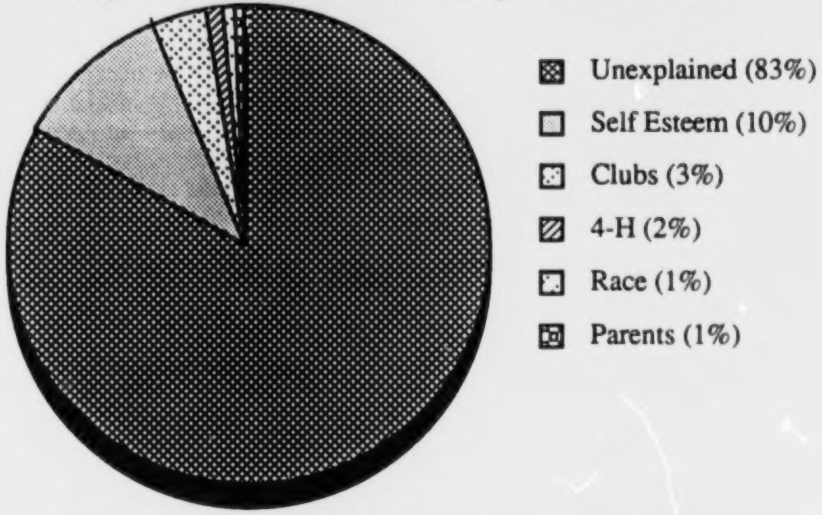
(Figure 1)-- Variance in Competency Life Skills Explained



(Figure 2)-- Variance in Coping Life Skills Explained



(Figure 3)-- Variance in Contributory Life Skills Explained



Four-H and other youth club involvement explaining portions of the contributory life skills development of the 8th graders support the findings of Schlutt (1987), who reported that alumni of youth leadership programs were more likely to be contributing, responsible members of the community. These findings further bolster the contention of Hamburg (1989), and the Grant Foundation (1988) that participation in clubs and community activities can be beneficial for young people as they progress through adolescence.

CONCLUSIONS

Because of the positive correlations with life skills development, parents, volunteers, and professional educators (formal and non-formal) should encourage youth to become involved in supervised youth clubs and educational programs. These programs should provide atmospheres which foster positive self-esteem and a good feeling of self-worth in adolescents (Grant Foundation, 1988; Hamburg, 1989; Hamilton, 1981; and Ianni, 1989).

Hamachek (1987) suggested that problem solving and decision making skills, a sense of responsibility, the ability to act on one's best judgement, a feeling of value and being of interest to others, and possession of values and principles which one feels good about as indicators of healthy self-esteem. Those indicators related closely to the three key components of successful life skills education programs as specified by Hamburg (1989) and Weatherford and Weatherford (1987).

The findings of this study suggest that self-esteem and the self-perceived development of competency, coping, and contributory life skills are complementary constructs. The primary question which remains unanswered is whether the development of life skills and self-esteem is sequential or simultaneous. If an adolescent develops some life skills then positive feelings of self-worth will follow--or if a young person has positive feelings of self-worth, he or she will be more likely to develop and practice new life skills. In actuality, the indications are that the two concepts possess a strong co-dependence on each other.

The findings suggest that participation in 4-H or other youth clubs can have a positive influence on the development of competency, coping, and contributory life skills in youth. This lends support to The Grant Foundation's (1988) assertion that participation in clubs and community activities can help young people build the base for a successful adolescence -- if one of the definitions of successful adolescence is the development of life skills. It may not be so important as to which youth organization a young person joins as much as that they should choose a club and participate.

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COMPETENCY, COPING AND CONTRIBUTORY LIFE SKILLS DEVELOPMENT OF EIGHTH GRADE YOUTH

A Critique

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What difference does it make if you are a 4-H member? This study attempted to provide further evidence to address this important question. Methodolically, the study was very sound. A theoretical framework was established, objectives were clearly stated, careful procedures were followed to produce reliable and valid results. I would have preferred that they reported that descriptive statistics were used in the "Analysis of Data" section.

Very little of the variance in the life skills areas was explained by the variables in the model (16, 23, and 17%) which points out the need for further studies to account for more of the variability. I fail to see the data to support the conclusion that we "... should encourage youth to become involved in supervised youth clubs and educational programs". The differences between 4-H and non-4-H participation was at the "hundredths level" and not significant, and no data were supplied relative to comparison by educational program. I also fail to see where this study "... suggest that participation in 4-H or other youth clubs can have a positive influence on the development of ... life skills in youth". This may be what the writes and some of the citations believe should result, but the data do not support such a conclusion. I believe the researchers would be better served not to make such extrapolations in their paper.

I believe that much more work is needed in the area of determining the benefits of youth organizations, and the experiential learnings which result from participating in them. I encourage other researchers to use this study as a foundation to launch more controlled investigations of possible functional relationships which might exist and would further elaborate upon the high proportion of unexplained variance.

PROCESSES USED BY SELECTED ILLINOIS EXTENSION AGENTS (ADVISERS) TO PRODUCE HIGH QUALITY PROGRAMS

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INTRODUCTION

The Cooperative Extension Service (CES) is the largest tax supported adult education agency in the United States (Jennings, 1988). The mission of Extension has most recently been described as helping "people improve their lives through an educational process which uses scientific knowledge focused on issues and needs" (Rasmussen, 1989, p. 223).

There is widespread agreement that the quality of education provided to citizens should be as high as possible. This agreement exists because people recognize that an economic and social system can be no better than the people of that system are capable of making it (Doyle & Levine, 1988). Resource constraints are a significant barrier to raising the quality of education. Therefore, efforts to improve quality frequently focus on increasing efficiency and relevance (Porter, 1988, p. 223).

This study focused on high quality Extension education programs produced by county advisers in Illinois. It determined how high quality programs were perceived and distinguished by middle managers in the Illinois CES, and it examined how they were produced by advisers. The study was conducted to provide information which may assist in the development of more high quality programs.

More particularly, in the first stage of the study, regional Extension directors participated in a delphi survey (Delbecq, Van de Ven Gustafson, 1975) which determined the criteria which they regarded as most important in distinguishing high quality programs. The delphi survey was supplemented by in-depth interviewing of regional directors to provide a more detailed and in-depth appreciation of how regional directors perceived high quality programs. The criteria that regional directors identified as most important in distinguishing high quality programs were then used, by them, to select advisers who consistently produced high quality programs.

The first stage of the study provided a springboard to the second stage which explored the planning efforts of county advisers who had consistently developed high quality programs. Selected home economics and agricultural advisers were interviewed, in-depth, to discover the processes they had used to develop programs.

The common processes that had been used by home economics advisers to develop programs were then compared to the common processes that had been used by agricultural advisers. This comparison was made because prior research (Wissemann, Clark, & Law, 1989) indicated that, in Illinois, advisers servicing different program areas may have developed different kinds of planning processes.

Finally, an assessment was made of the extent to which the common planning processes were incorporated into an existing theoretical model which had been widely promoted within Extension. The model was one developed by Boyle (1981).

PURPOSE AND OBJECTIVES

The primary purpose of this study was to analyze and describe the actual planning processes commonly practiced by advisers who produced high quality programs. A secondary purpose was to determine if these commonly used planning processes had been incorporated into an existing comprehensive theoretical model for program planning. The following research questions were addressed:

1. How do Illinois regional Extension directors' perceive high quality Extension programs?

2. What criteria are most acceptable to these directors as a basis for distinguishing high quality programs?

3. What common program development processes are used by county agricultural advisers who, as perceived by regional directors, produce high quality programs?

4. What common program development processes are used by county home economics advisers who, as perceived by regional directors, produce high quality programs?

5. How do the common program development processes used by agricultural advisers compare with those used by home economics advisers?

6. To what extent have the common processes used by Illinois advisers to produce high quality programs, in each of the program areas mentioned above, been incorporated into Boyle's (1981) model for a developmental program?

PROCEDURES

The study was conducted in two stages. In the first stage, a delphi survey was used to identify the criteria that Illinois regional Extension directors considered most important in distinguishing high quality programs. A delphi survey uses a sequence of questionnaires to aggregate the judgments and opinions of experts to obtain more rational and considered collective judgments (Delbecq, Van de Ven, & Gustafson, 1975). Regional directors for the Cooperative Extension Service were selected as the experts since they serve in first-line supervisory positions. All seven regional directors participated in the delphi survey. Each was interviewed for the first round while the two subsequent rounds were administered by mail. The pivotal statement around which the delphi procedure was followed stated:

> "Please think of some programs you consider to be of high quality. Now please think of why you consider these programs to be of high quality. The reasons why you consider these programs to be of high quality constitute the criteria you would use to identify high quality programs. Please carefully define these criteria. (Some potential criteria are listed below to assist your thinking. You may include any or all of these criteria in your list, with or without amendment. However you may choose to include none of these.

Please define criteria in concrete rather than abstract terms. Please be as specific as possible.)"

Responses were summarized and mailed to participants in the second round in which they were asked to rate the importance of each criterion on a scale where seven signified "very important" and one signified "unimportant". After summarizing information from the second round, a third round questionnaire was mailed which listed means and ranges of the ratings given in the second round. No significant changes occurred as a result of the third round.

For a measurement to be acceptable, the measurement device needs to exhibit adequate reliability and validity. Two steps were taken to secure evidence of reliability of the selection performed by regional directors. First, one week after the selection procedure was completed, regional directors were contacted by telephone to investigate the conscientiousness with which they performed their selection and to solicit additional comments. The second step was to have each top adviser rate one of their top programs using the criteria selected by the regional directors and this information was then evaluated. It was not necessary to take steps to determine the validity of the selection procedure. Construct validity was not an issue because their was no intention or desire to define quality in terms of a theoretically based construct. Likewise, content validity was not in question because the delphi technique, by its very nature generated a set of criteria which reflected an adequate domain of content.

Regional directors were then asked to use the identified criteria to select the agriculture adviser and the home economics adviser in their region who had consistently produced high quality programs. Only advisers with over three years experience were considered.

The second stage involved interviewing the seven county home economics and the seven county agricultural advisers who were identified as having produced high quality programs in order to identify common processes. The common processes used by agriculture advisers were then compared to the common processes used by home economics advisers. An emergent design underpinned the data collection process. The term emergent refers to open-ended data collection where new ideas and concepts are progressively explored and data collection continues until redundancy is evident (Lincoln & Guba, 1985).

Finally, Boyle's (1981) model for a developmental program was examined to determine the extent to which the common processes used by advisers had been included.

ANALYSIS OF DATA

Phenomenological analysis (Denzin, 1989) was the form of qualitative analysis used to analyze the data. This type of analysis is characterized by an analytical framework which includes: a) engaging in introspection to become aware of personal biases and preconceptions and then eliminating them as much as possible; b) bracketing the data obtained in interviews; c) organizing the bracketed data into meaningful clusters; d) identifying invariant themes in the clustered data; and e) describing each theme in a way which portrays its texture and essence. Mechanically, data analysis included reading transcripts of interviews and listening to tapes of these interviews at the same time (to study tone of voice and emphasis). Statements and phrases were coded under various headings.

In qualitative research, the trustworthiness of the data and the conclusions drawn by the researcher, depend largely on the integrity and skills of the researcher (Patton, 1990). However, trustworthiness can be enhanced through incorporating triangulation into the research design (Miles & Huberman, 1984) which was done in this study.

The movement and assembly of text to facilitate analysis was accomplished using a microcomputer program called Ethnograph (Seidel, Kjolseth, & Seymour, 1988).

RESULTS

The first round of delphi technique used in stage one of the study resulted in identifying 24 criteria used by regional directors to rate high quality programs. By the third round of the delphi, the five most important criteria had been agreed upon and they included:

1. practice changes that were targeted at the outset were accomplished;
2. a specific need in a clearly identified target audience was addressed;
3. a large number of program participants changed practices as a result;
4. behavioral objectives were formulated; and
5. program content reflected application of the most important research information.

The top five items were chosen because a relatively large difference in adjacent, average ratings occurred between the items ranked fifth and sixth most important.

In stage two of the study, all seven home economics advisers identified by regional directors as consistently producing high quality programs based on the agreed upon criteria from stage one were female. Their experience ranged from seven to 20 years and all had a master's degree except for the least experienced adviser.

Data analysis identified common processes these advisers had used to produce high quality programs. These common processes fell into the following categories:

1. networking with other agencies;
2. use of volunteers;
3. knowledge of county;
4. needs identification;
5. flexibility;
6. fostering teamwork;
7. program design and delivery;
8. effective publicity; and
9. obtaining recognition for successful programming.

One female and six male agricultural advisers were identified by regional directors as consistently producing high quality programs based on the agreed upon criteria from stage one. Their experience ranged from eight to 27 years and all had a master's degree.

Data analysis identified the following categories of common processes used by agricultural advisers to produce high quality programs:

1. knowledge of county;
2. needs identification;
3. flexibility;
4. use of subject matter expertise;

5. program design and delivery; and
6. use of mass media.

Twenty four common processes were identified in total. Seven of these were found in both groups of advisers:

1. knowledge of county;
2. reviewing and identifying needs throughout each year;
3. advisers rather than their program councils originally identifying many of the needs ultimately addressed through CES programs;
4. flexibility;
5. tailoring curriculum materials;
6. organizing and coordinating program delivery; and
7. use of mass media.

Common processes unique to home economics advisers were mainly concerned with the categories of networking, and encouraging and managing participation by council members and other volunteers. Two common processes were found only among agriculture advisers. These included identifying a need before considering programming options, and use of subject matter specialists.

The final stage in this study was to assess the extent to which the common processes identified by either home economics or agricultural advisers had been incorporated into Boyle's model for a developmental program. Most of the common processes used by advisers closely parallel concepts either depicted by Boyle in his model or discussed by him prior to presenting his model. A few of the ways in which common processes differed from Boyle's model were as follows:

1. Advisers used specific forms of networking and strategies to develop and maintain relationships with other agencies not mentioned by Boyle;

2. Advisers used volunteers to enable them to deliver more expansive programs which was not mentioned by Boyle;

3. Advisers relied on their subjective impressions and understandings of the county, whereas Boyle emphasized using objective data; and

4. Advisers rather than their program councils originated many of the needs ultimately addressed through CES programs.

CONCLUSIONS

As a result of this research, the following conclusions were developed:

1. The 24 criteria identified through the delphi survey represent characteristics which regional directors believe distinguish high quality Extension programs;

2. The sharing of these criteria with other advisers would provide them with the opportunity to reflect upon and compare what they do to produce programs with what regional directors believe is necessary to produce high quality programs;

3. Home economics and agricultural advisers have each produced high quality programs using certain common processes. These processes should be focussed upon in pre-service and inservice training activities for all advisers to help them understand how to produce high quality programs;

4. There were common processes unique to each group of advisers which should be more fully analyzed and focussed upon in pre-service and inservice training activities for advisers; and

5. The fact that some common processes used were a part of Boyle's model and some were not suggests the need to re-evaluate the model in light of the environment in which advisers are working today.

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PROCESSES USED BY SELECTED ILLINOIS EXTENSION AGENTS (ADVISERS) TO PRODUCE HIGH QUALITY PROGRAMS

A Critique

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Determining those characteristics which make exemplary programs particularly effective is a worthwhile undertaking. Such efforts are particularly needed in Extension where program planning models have flourished for years, but little empirical evidence exists about the efficacy of the models. The Delphi model and qualitative dimensions of this study were probably very appropriate for the conduct of this exploratory investigation. The analysis procedures employed in the study seem appropriate. This study was not an easy undertaking and the authors should be commended for doing it.

Some suggestions I would have relative to the study include:(1) research question one was not answered; and perhaps it could not be, given that it was rather ambiguous in saying "how do they perceive...?" (2) Delphi methods would include sharing comments from the panel as one moved to the second and third rounds, not just data, how was this accomplished? (3) the authors are unclear about how they established reliability by "investigating the conscientiousness" of the directors. This does not communicate anything to me. (4) Why did they select only people with over three years experience?
(5) How was triangulation used to improve the "trustworthiness of the information? (6) In Results, aren't criterion #1 and #3 the same? and (7) For #5, how was "reflected application of the most important research information" measured or determined?

Conceptually, I would have been much more comfortable in reading this paper if I had an operational, or constitutive, definition of a "program". I suspect apples and oranges may have been being described.

The essence of science is comparison! The implications of the study would have been much greater if one could have examined how the program planning was done by "unsuccessful" advisers. Does the process differ? If so, in what ways? The litmus test of many studies may be to ask the question: "So what?"

PERCEPTIONS OF AGRIBUSINESS LEADERS TOWARD AGRCULTURAL EDUCATION IN NEBRASKA

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INTRODUCTION

The need for change today is perhaps no greater than within the ranks of public programs in agricultural education. Technological advancements coupled with the need for even greater economic efficiency not only continues to encourage and force change, but suggests that the pressures for even better educational programs in agriculture will continue until change actually occurs or most importantly is actually perceived to occur.

Miller (1983), stated that "other teachers also often perceive our students (agricultural education) as the less talented and our instructional content as less than rigorous." He further indicated that "our image with legislators is best characterized as politically naive. Legislators are much more likely to recognize the term FFA Advisor than teacher of Vocational Agriculture. Since most legislators come from and represent urban areas, they often perceive that the industry for which we are training is diminishing."

In a study of teacher perception of secondary programs of agricultural education in Missouri, Birkenholz (1987) concluded that "agricultural education should monitor the environment in which vocational programs operate." He further suggested that the programs must then be modified to meet these environmental condition.

Stewart, Langhari and Gott (1983) conducted a study to verify the professional competencies needed by teachers of vocational agriculture in Missouri as perceived by secondary school administration and to compare those perceptions with those of (agricultural education). Considerable differences were found between groups surveyed with respect to perceptions of competencies needed by teachers of vocational agriculture.

Much attention has also been given to the identification of educational competencies needed by vocational agriculture teachers and competencies that need to be taught in the classroom. (Garner, 1974; McGhee, 1967; and Moore and Bender, 1975). These studies also result from general perceptions often from within the profession itself or from various focused clientele groups.

The 1988 report Understanding Agriculture, New Directions for Education, from the National Research Council, recommends that major revisions be made in Agricultural Education programs with new curriculum components to more adequately prepare persons for jobs in natural resources, agribusiness, marketing, management, and national and international economics.

Spotanski and Foster (1989) found that customer relation skills and communication skills were the most required skill categories identified by Nebraska agribusiness managers. Cooper (1985) reported a need for continuous revision of competencies needed for agribusiness employment.

In spite of a comprehensive review of the related literature, few studies were found which attempted to assess the perceptions of local agribusiness leaders with respect to Agricultural Education in a specific state. This lack of information with respect to the perception of agricultural leaders became the main focus of this study.

PURPOSE AND OBJECTIVE

The purpose of the study was to determine the perceptions of agribusiness leaders with regard to where various agricultural knowledge, skills and attitudes should be taught at the elementary, junior high, and high school levels.

PROCEDURES

To accomplish the objective of this study, a two-stage design was employed in a cooperative research effort between representatives in the Agricultural Education Department at the University of Nebraska-Lincoln and SRI/Gallup, a national marketing organization based in Lincoln, Nebraska. The first stage was a Delphi procedure and the second was a telephone survey.

DELPHI PROCEDURE

The Delphi procedure used was modified from standard Delphi procedures.

Step 1. A sample of 50 agribusiness and agriculture education leaders in Nebraska were selected by a jury from the Agricultural Education Department at the University of Nebraska-Lincoln and the Agricultural Education Section of the Nebraska Department of Education. The jury identified leaders who were informed and concerned about agricultural education in Nebraska. These 50 leaders were sent seven open-ended questions; the questions asked respondents what skills, attitudes and knowledge they felt Nebraska elementary and secondary schools should be teaching students to prepare them for the future in agriculture.

The seven questions were:

A. To directly enter the agribusiness job market following high school graduation:
    1) What essential agricultural knowledge must a young person possess?
    2) What basic attitudes must they hold?
    3) What critical skills must they possess to enter the work force?

B. For the student that graduates from high school and enters a post secondary agriculture based program:
    4) What essential agricultural knowledge must they possess?
    5) What basic attitudes must they hold?
    6) What critical skills must they possess?
    7) What general knowledge of agriculture should all informed consumers have so they can better understand the role of agriculture in contemporary society?

The mailing, supported by telephone follow-up calls, had a 76 percent return rate. Responses to the open-ended questions were summarized. Thirty-eight essential knowledges, twenty-seven basic attitudes, and thirty-four critical skills were listed for persons who were preparing to directly enter the production agriculture or agribusiness job market following high school and plan to enter a university or post-secondary agriculture program.

Step 2. A questionnaire that included the knowledges, attitudes, and critical skills recommended for each of the seven questions in Step 1 was prepared. This questionnaire was forwarded to the original 50 respondents. For this step, a researcher judgement was made to ask each respondent to mark the five most important knowledges, attitudes, and critical skills of those listed. This mailing, supported by telephone follow-up calls, had an 80 percent return rate. Responses to this questionnaire were tallied and the most frequently cited suggestions/recommendations were included in the telephone instrument.

TELEPHONE SURVEY

The telephone survey instrument included the 24 highest priority knowledge, skill, and attitude recommendations as identified in Step 2 of the Delphi procedure.

Based on the results of the second step of the Delphi procedure, twenty-four skills, attitudes, and knowledges were ranked as important, and were included in the telephone survey of the 264 Agribusiness leaders and educators.

Two trained telephone interviewers from SRI-Gallup Research used a read-verbatim telephone procedure to collect data. The telephone survey sample included 264 respondents. One sample sub-group was 131 or 51 percent educators. The second sample sub-group was 130 or 49 percent agribusiness leaders and related leaders. The educators were randomly selected from twelve different educational organizations, were proportionally distributed by membership, and constituted a 10 percent sample. Business leaders were randomly selected from 25 different prominent statewide organizations, were also proportionally distributed by membership, and also constituted a 10 percent sample.

DATA ANALYSIS

Results of the study were summarized using percent or mean values. Results for the educator and business samples were systematically compared using appropriate inferential statistical techniques. In all statistical comparisons, statistical significance was defined at the .05 level of probability.

FINDINGS AND RESULTS

Skills, Attitudes and Knowledge:

Eight of the twenty-four skills, attitudes, and knowledge item were deemed "critical" for entry into the work force or for college for secondary school graduates. The eight critical skills, attitudes, and knowledge items were:

1. Honesty, integrity, and fairness
2. Continue to learn
3. Positive work ethic
4. Willingness to work-cooperation
5. Reading comprehension
6. Written communication
7. Math and computation skills
8. Listening skills

Perceptions of Where Agricultural Knowledges, Skills, and Attitudes Should Be Taught:

No differences existed between educators and agribusiness leaders in their belief that present Nebraska secondary Agricultural Education programs are providing current and relevant instruction for todays agribusiness needs.

Both respondent groups believed it was "quite important" for the general consumer to possess:

1. An awareness of the farmer's, rancher's, and agribusiness person's roles in U.S. and international economics.

2. A broad knowledge of where food comes from and agriculture's contribution to our society.
3. A knowledge of the cultural, social, economic, and political importance of agriculture.
4. An understanding of how changes in agriculture affect all citizens.
5. An understanding of conservation of our natural resources such as water, soil, air, and wildlife.

Both respondent groups also believed that:

1. Basic consumer-related agriculture knowledge, attitudes, and skills should first be taught in elementary school.
2. Introductory production agriculture and agribusiness knowledge, skills, and attitudes should first be taught in junior high school.
3. Science, technology, economics, management, and accounting principles of agriculture should first be taught in the high school.

RECOMMENDATIONS

Based on the results in the study, the following recommendations were made:

1. Significant efforts be made by Agricultural Educators to develop programs designed to educate the consumer, beginning in the elementary school, about the farmer/rancher role in the United States and the effect of our international economy, the food chain, the cultural social and political importance of agriculture, and conservation of our natural resources.
2. Introductory production agriculture and agribusiness knowledge, skills and attitudes be introduced to junior high school teachers, through teacher education programs and inservice programs.
3. Research should be planned which measures the extent to which science, technology, economics, and management and accounting principles of agriculture are actually taught in the high school.
4. Efforts be continued by state Agricultural Education leaders, educators, and agribusiness leaders to support and educate the general public concerning the need to plan and conduct programs for:
   a. Agriculture - related instruction in the elementary school.
   b. Agriculture - related instruction in the junior high school.
   c. Vocational Agriculture education in the secondary school.
   d. Continuing education courses for young farmers, ranchers, and other adults.
   e. Supervised occupational experience for high school students.
   f. FFA
   g. Summer educational activities provided through Agricultural Education teachers.

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PERCEPTIONS OF AGRIBUSINESS LEADERS TOWARD AGRICULTURAL EDUCATION IN NEBRASKA

A Critique

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The researchers examined the question of what should be taught regarding agriculture in the public schools of Nebraska. In this study, the perceptions of agribusiness leaders and educators were sought. The research was clearly a major reexamination of where agricultural concepts and the agricultural education curriculum should belong in Nebraska and involved substantial time and resources.

Strengths

The study represents one of the most important questions facing the field of agriculture today. If indeed, education both in and about agriculture are to be the way of the future, then such research is desperately needed. This may well be the first major attempt to operationalize the broad concepts advocated in Understanding Agriculture.

The researchers entered the study with a major qualitative effort at building a valid instrument with the very open-ended approach of: "What should be . . .". This allowed the researchers to avoid preconceived biases of what the program ought to be like in building the instrument. Instruments based on literature reviews tend to reinforce current structures and programs. The use of a delphi study in instrument development strengthens the study.

Data were collected by means of a telephone survey conducted by trained survey teams using a structured interview. This is a rigorous technique that improves drastically over even the most carefully done mail surveys.

Concerns

The "delphi" approach used was described in some detail. That space could have been used more effectively in such a short paper. The authors describe it as a modified delphi. Indeed it is severely modified.

Many of the "agricultural knowledges, skills, and attitudes" identified and used on the interview instrument appear to be very general in nature. We cannot make a strong case that basic skills (e. g., reading, math, and listening) are agricultural. We can argue that agricultural education is a good model for producing such outcomes, that agriculture is an effective context within which such outcomes can be pursued, and that people in agriculture need such outcomes. Discussion of such general outcomes detracts from the real and substantive findings presented in the paper.

Most of my other concerns could have been addressed (and probably would have been) if the allowable length of the paper had been adequate:

1. What was the basis for the numbers in the delphi and interview samples? The numbers of 131 and 130 are given but not justified.
2. The paper indicates, "Results . . . were systematically compared using appropriate statistical techniques." At least a brief listing of the analytical procedures is needed to provide a reinforcement of the findings.
3. The paper makes no effort to describe the educators who were selected for the interview. It simply says that a sample of 131 educators from 12 different organizations were selected. Why were these persons appropriate?

PERCEIVLD COMPONENTS NEEDED IN PROGRAMS OF AGRICULTURE

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INTRODUCTION

Agriculture and education have undergone major changes in the past few years. Agriculture has experienced fast moving changes in technology, genetic engineering, and marketing. Education has experienced changes in curriculum, competency-based instruction, and scholastic report cards as a response to reports such as the 1983 National Commission on Excellence in Education report, A Nation At Risk. "Change is rampant in agriculture, and agricultural education must keep pace or become an obsolete remnant of the past" (National Summit on Agricultural Education, 1990, p. 1).

Historically, agricultural education focused on instruction in agriculture, supervised occupational experience programs, and leadership development through student organizations. The student organization, the FFA, was established in 1928 as an integral part of vocational agriculture. In 1950, the passage of Public Law 740 legislatively recognized the FFA as an integral part of vocational agriculture (Official FFA Manual, 1990). Other agriculturally focused student organizations followed such as the Young Farmers, Young Farm Wives, and the Postsecondary Agricultural Student Organization (PAS).

Change is a naturally occurring phenomenon with almost everything in our society. Moore (1963) noted that "rapid change occurs frequently and constantly" (p. 2). In the context of agricultural education, researchers have noted that students have changed, society has changed, and educational systems have changed (Herren, 1990).

While change is an ongoing process, it must not be taken lightly or without careful consideration. Whoever is instrumental in serving as a change agent must be concerned with not only the group and group values, but also with the perceptions the group holds regarding the credibility of the change agent. Change often occurs in informal settings. Stewart (1980) indicated that "to the extent that we propose to influence the direction of our institutions and programs, we must attempt to direct change by careful planning and honest appraisal of projected outcomes" (p. 2).

Change is a part of modern society (Naisbitt, 1983). America and agriculture are changing rapidly. Many concerns have been expressed regarding the future of agriculture programs in the nation's schools. In the 1980's, conferences were held in Connecticut, Idaho, Missouri, New York, Georgia, and other states regarding the future of agricultural education. As a result, a national effort began to examine agricultural education and develop new directions for programs in the public schools.

Much has been written about the need for change in agricultural education in the last five years. Two major reports, Understanding Agriculture--New Directions for Education and The Strategic Plan for Agricultural Education--A National Mobilization Plan for Revolutionary Change in Agricultural Education, developed by the National Summit on Agricultural Education (1990) have had a major impact on agricultural education. Both identified the need for change and emphasized the need for a central focus for agricultural education. The greatest problem seems to be that specific program modifications and directions are unclear.

Some research has been conducted to document and begin to develop agricultural education program models. However, these studies appeared to focus on the need for change rather than specific agriculture program components that need to be added, eliminated, modified, or refocused.

STATEMENT OF THE PROBLEM

A review of the literature revealed little information regarding perceptions of those directly involved with the future direction of agricultural education programs. This information was needed because of the uncertainty that existed concerning the focus of agricultural education programs. Limited research was found which compared the perceptions of key groups regarding the perceived need for program changes in agricultural education. Therefore, the focal point of this study was to provide information about program modification and program direction for agricultural education.

PURPOSE AND OBJECTIVES

The specific purpose of the study was to collect and analyze information from the perceptions of agriculture instructors, state leaders in agricultural education, secondary school principals, vocational/technical school directors, and local agricultural education program advisory committee members regarding the operation of local agricultural programs based upon the seven goals of The Strategic Plan for Agricultural Education.

To fulfill the purpose of the study, the following research questions were formulated as well as a related null hypothesis for question two.

1. What are the perceptions about needed program components in agricultural education held by secondary school principals, area vocational/technical school directors, agriculture instructors, state leaders in agricultural education, and local agricultural education program advisory committee members?

2. Are there differences in perceptions about needed program components in agricultural education among the secondary school principals, the area vocational/technical school directors, agriculture instructors, the state leaders in agricultural education, and local agricultural education program advisory committee members? (Ho: There are no significant differences among the responses of the groups.)

PROCEDURES

The population included all Missouri secondary schools offering an agriculture program (N = 244) and the state leaders in agricultural education (N = 15).

The population was stratified by program type and categorized according to schools offering an agriculture program in which the secondary school was a host district to an area vocational/technical school (N = 36) and schools offering an agriculture program in which the school was not a host district to an area vocational/technical school (N = 208). All of the area school programs and a proportional random sample of 130 of the 208 programs in which the school was not a host district to an area vocational school were surveyed. The sample size was based on the Krejcie and Morgan (1970) formula. Only agriculture instructors with two or more years of experience in teaching agriculture were included in the study. By using the above criteria, 555 individuals were sent copies of the instrument.

A total of 464 individuals returned instruments representing a response rate of 84 percent of the people surveyed. Of the 464 responding, 311 returned usable responses to all instrument items representing a 56 percent usable response rate.

The correlation point biserial index (RPBI) was used to determine the discrimination power of instrument items. Schattger (1987) found that those keyed responses below a +.20 do not relate to the entire set of items and should not be included in the analysis. Therefore, 41 items of the original 62 were used for analysis.

A Cronbach coefficient alpha reliability estimate was calculated on the 41 items. A reliability coefficient $\underline{r}$ = .90 was obtained. Principal components factor analysis using orthogonal rotation was used to group the items. A five-factor pattern was selected as the optimal solution based on a scree plot of eigenvalues and the conceptual soundness of the factors. A comparison of means and standard deviations for the five factors using respondents with complete data sets as compared to respondents with incomplete data sets revealed similar values. A multiple analysis of variance (MANOVA) procedure was also utilized to compare early and late respondents on the mean factor scores and revealed no significant differences.

RESULTS

Means and standard deviations based on a 5.0 Likert-type scale (5 = strongly agree to 1 = strongly disagree) were presented to answer question 1. Based on responses of the total group, 21 (51%) of the items received a mean rating score of 4.00 or greater, and three (7%) received a mean rating of less than 3.00. Therefore, the majority of the concepts identified in the instrument were judged to be important.

The second research question and related null hypothesis was designed to ascertain if there were differences among groups about program components in agricultural education. The analysis was based on the factors identified by factor analysis.

The factor analysis revealed five factors comprised of items with loadings greater than .30. The factors, the number of items, and the item concepts were:

1. Elements of a Secondary Agriculture Program, 10 items: components to give emphasis include supervised experience, leadership and personal development, problem solving, contests, entrepreneurship, FFA, laboratory activities, and agriscience.

2. State and Local Policy Interface, nine items: grant science credit for three units of agriculture or competencies in an agriculture course, FFA activities only after school, FFA meetings held during school day, program standards should include year round employment and a SAE supervisory period, and agriculture courses are for college-bound and for students seeking employment.

3. FFA, seven items: FFA membership should be available to all students in grades 7-12, 9-12, or agriculture students 9-12: programs should have an FFA chapter; FFA attracts students; membership should be required; and advanced students should have prior agriculture courses.

4. Agricultural Program Guidelines, nine items: program should include one adult course, 180 SAE visits and one advisory committee meeting per year; expanded adult programs in agribusiness and horticulture; students should keep notebooks, record books; and 65 percent of students should be placed in agricultural occupations.

5. Agricultural Literacy, six items: agricultural subject matter should be integrated grades K-6, 7-9, and/or 10-12; all K-12 students should be agriculturally literate; junior high students should take nine weeks of agriculture; and students should enroll in agriculture for general information.

A multiple analysis of variance (MANOVA) procedure was utilized to ascertain if a significant ($p<.05$) difference existed between mean factor scores among the groups of respondents. The results of the MANOVA procedure revealed a Pillai's Trace of 0.81 with an equivalent F (30,1520) of 9.80, $p = .01$. Therefore, the null hypothesis was rejected.

The ANOVA tests (see Table 1) revealed significant differences among the groups on Elements of Secondary Agriculture Programs, the Interface of State and Local Policy, and the FFA. No significant differences were found for Guidelines for Agriculture Programs and Agricultural Literacy.

Table 1

Analysis of Variance for Differences in Perceptions of Future Program Directions in Agricultural Education by Factors

Factor	df	Sum of squares	Mean square	F	R^2	p
Factor 1 - Elements of a Secondary Agriculture Program	6	139.68	23.28	41.55	0.45	0.01*
Factor 2 - State and Local Policy Interface	6	84.11	14.02	18.87	0.05	0.03*
Factor 3 - FFA	6	14.26	2.38	2.44	0.05	0.03*
Factor 4 - Agriculture Program Guidelines	6	14.12	0.69	0.68	0.01	0.66
Factor 5 - Agricultural Literacy	6	9.09	1.52	1.53	0.03	0.17

*Significant at $p<.05$.

An examination of the data presented in Table 2 revealed that state leaders rated the factors higher than other groups and that teachers rated Elements of the Program higher but Policy Interface lower than administrators. The Least

Table 2

Mean Factor Scores and Standard Deviations by Groups

Group	$\bar{X}$*	SD
Factor 1 - Elements of a Secondary Agriculture Program		
High school agriculture instructors	4.40	0.69
AVTS agriculture instructors	4.38	0.61
High school principals	4.02	0.74
AVTS directors	4.22	0.69
High school advisory committee members	4.29	0.66
AVTS advisory committee members	4.16	0.64
State leaders of agricultural education	4.67	0.49
Factor 2 - State and Local Policy Interface		
High school agriculture instructors	3.99	1.19
AVTS agriculture instructors	3.88	1.20
High school principals	3.13	1.24
AVTS directors	3.64	1.15
High school advisory committee members	3.70	1.05
AVTS advisory committee members	3.67	1.02
State leaders of agricultural education	4.01	1.11
Factor 3 - FFA		
High school agriculture instructors	3.38	1.51
AVTS agriculture instructors	3.22	1.44
High school principals	2.98	1.27
AVTS directors	3.46	1.31
High school advisory committee members	3.40	1.28
AVTS advisory committee members	3.41	1.23
State leaders of agricultural education	3.57	1.63
Factor 4 - Agriculture Program Guidelines		
High school agriculture instructors	3.67	1.06
AVTS agriculture instructors	3.67	1.09
High school principals	3.57	0.89
AVTS directors	4.07	0.94
High school advisory committee members	3.92	0.94
AVTS advisory committee members	3.76	0.79
State leaders of agricultural education	4.44	0.94
Factor 5 - Agricultural Literacy		
High school agriculture instructors	4.21	0.87
AVTS agriculture instructors	4.05	0.86
High school principals	3.42	1.11
AVTS directors	3.87	1.01
High school advisory committee members	4.07	0.93
AVTS advisory committee members	3.96	0.99
State leaders of agricultural education	4.58	0.74

*Data were collected on a 5 point Likert-type scale on which "5" = strongly agree and "1" = strongly disagree.

Square Means procedure was used to identify significant differences among groups and the results are reported in Table 3.

Table 3

Differences by Least Square Mean Scores Between Groups by Factor

	High School			Area Vocational\Technical School			
	Ag. instr.	Prin.	Adv. comm. memb.	Ag. instr.	Dir.	Adv. comm. memb.	State leaders
High School							
Agriculture instructor		1*,2,3	1*,2		1,2	1,2	1,2
Principal			1,2,3	1,2	1,3	2	1
Advisory committee member				2	2		1
Area Vocational\Technical School							
Agriculture instructor					2	1	1,2
Director						2	1
Advisory committee member							1

*Significant at the .05 level between groups (1,1). Factor 1 - Elements of a Secondary Agriculture Program, Factor 2 - State and Local Policy Interface, and Factor 3 - FFA.

Although there were differences among groups on three of the five factors, the finding with greatest practical application relates to the high rating given 38 of the 41 items. The three items with total group ratings below 3.0 were: FFA activities should only be held after school or on Saturdays, FFA membership should be available to grade 7-12 students, and FFA membership should be available to all 9-12 students. In contrast, the four items with total group ratings above 4.4 were: the agriculture program should emphasize leadership and personal development and problem solving, FFA provides an avenue for leadership and personal development, and program standards should include having an FFA chapter.

CONCLUSIONS AND IMPLICATIONS

Implications as a result of this study suggest that having an FFA chapter, instruction in leadership and personal development, supervised experience programs, and laboratory activities are elements of an agriculture program that should be continued. This is consistent with the concept of classroom/laboratory instruction, supervised experience programs, and leadership development as the basis of the current model for program delivery. In addition, the elements of an agriculture program that should receive increased emphasis include problem solving instruction, entrepreneurship, FFA involvement, and integration of agriscience into the curriculum. All of these components are supportive and congruent with the seven goals of The Strategic Plan for Agricultural Education.

All groups included in this study support the concept that students K-12 should be agriculturally literate (i.e. have a general understanding about agriculture) and that agriculture subject matter should be integrated into other subjects in grades 7-12. This supports the need for teaching about agriculture as described in the National Research Council Report, Understanding Agriculture - New Directions for Education.

Further implications of the study suggest that agriculture courses are appropriate for students seeking additional training as well as those students preparing for employment after high school. This supports the emphasis on "tech-prep" in recent vocational legislation.

The diversity among groups on the State and Local Policy Interface factor may reflect a lack of communication and/or understanding of state and local program policies or a disagreement about the type of policies that should be administered. It appears that additional research needs to be completed in this area to reflect a more consistent direction for policy development.

The only significant differences reflected by the study regarding the FFA were between the high school principals and AVTS directors. The differences in the comprehensive high school agriculture program versus the AVTS agriculture program, the possible difference of focus of these types of delivery systems, and the difference in the students that are served may be reflected in the administrators' responses.

In summary, the results of this study help identify the elements of an agriculture program that need to be maintained and emphasized. The question of how they should be maintained and emphasized requires further study. This study implies that agriculture program models reflecting differences in student outcomes may need to be developed and piloted. The question of whether different types of agriculture programs should be offered at the area vocational/technical school versus the comprehensive high school as well as the policy implications of different agriculture programs having a separate focus should be examined.

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PERCEIVED CHANGES NEEDED IN PROGRAMS OF AGRICULTURE

A Critique

William G. Camp, Virginia Tech -- Discussant

A number of national initiatives regarding curricular and programmatic developments in agricultural education have produced a sense of urgency within the profession to undertake drastic changes. The authors examined the question of needed changes by seeking perceptions of principals, vocational directors, agriculture teachers, advisory council members, and state agricultural education leaders.

Strengths

This is the most fundamental question facing agricultural education today. As we examine our profession and prepare for the future, what ought agricultural education to become? I can think of no more worthwhile question to ask. The authors are to be complimented for their insight and foresight.

This paper literally could be used as a case-study in research methodology and analytical procedures. The researchers employed an impeccable design and analytical procedure. The analytical techniques used were not only impressive, they were carefully selected and appropriately applied. It is rare to see a single study that employs such a range of statistical tools: point biserial correlation, Cronbach's alpha, principal components factor analysis with orthogonal rotation, MANOVA to compare early and late respondents, and MANOVA to compare main effects followed by ANOVAs to isolate details within main effects, R^2 to examine the strength of the effects, and Least Square Mean Scores to examine multiple groups on multiple variables.

Concerns

For such an important study, a strong theoretical base is needed. That is not addressed in the paper and a total absence of such consideration may imply that inadequate attention was paid to it in the planning stage of the research.

The instrumentation is not described adequately. This is undoubtedly a function of the page limitations of NAERM.

I have questions about the selection of the samples of respondents. Again, the page limits of this conference may have made it impossible for the authors to explain the sampling procedures.

The nature of the questions and the selection of the respondents predisposed agreement on everything. It is no surprise that the mean factor ratings by group included 27 in the agree to strongly agree range (3.5--5.0) and none in the disagree to strongly disagree range (1.0--2.5). The authors essentially conclude that there is consensus on the concepts advocated in the Strategic Plan for Agricultural Education and Understanding Agriculture -- New Directions for Education. Yet when one examines the components described in the findings, one is struck by the degree to which the *status quo* is described. Does this mean that we restructure the profession by continuing business as usual? If we need only continue our existing program, then why all the calls for reform?

A COMPARISON OF NATIVE AND TRANSFER UNDERGRADUATE AGRICULTURE STUDENTS: ACADEMIC APTITUDE, ACHIEVEMENT AND DEGREE PERSISTENCE

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The enrollment of junior college transfer agriculture students at Mississippi State University has steadily increased during the past decade. In 1977, 38% of all undergraduate agriculture majors were junior college transfers; by 1987, junior college transfers accounted for 42% of the total undergraduate agriculture enrollment (Taylor, 1989).

Research has indicated that significant differences exist between students beginning their collegiate careers at two-year institutions and those initially enrolling at four-year institutions. Two-year college transfer students generally have lower achievement test scores and quality point averages (QPA) than students beginning college at four-year institutions. In addition, research has indicated that once enrolled in a senior college, transfer students are less likely to complete a baccalaureate degree than are students who initially enroll at four-year institutions (Cohen and Brawer, 1982). Finally, students transferring to four-year institutions and earning a baccalaureate degree require a longer period of time to complete degree requirements (Menke, 1980).

Grimes and Hausenfluck (1980) compared non-transfer (native) and transfer agriculture students at Texas A&M University. The researchers determined that transfer students had a lower level of academic aptitude (as indicated by ACT and SAT scores) than did native students. However, no significant differences were found between the two groups for their mean cumulative QPA at graduation or for their level of persistence in completing the bachelor's degree.

PURPOSE AND OBJECTIVES

The primary purpose of this study was to compare native and junior college transfer students at MSU to determine if significant differences exist between the two groups on measures of academic aptitude, academic performance and degree persistence. The specific objectives of this study were to:

1. determine if significant differences exist between native and junior college transfer students on composite ACT scores,
2. determine if significant differences exist between native and junior college transfer students on cumulative undergraduate QPA, and
3. determine if significant differences exist between native and junior college transfer students in completing an undergraduate agriculture degree program at MSU.

PROCEDURES

This study employed the ex post facto research design as described by Campbell and Stanley (1966). This design was selected since the researchers were unable to manipulate the independent variable of group membership (i.e. native or transfer student).

The population of native students (N=60) was composed of all undergraduate agriculture majors enrolled during the fall 1987 semester who had: (a) initially enrolled at MSU as a full-time student (12 or more semester hours) for the fall 1985 semester and (b) had met MSU requirements for classification as a new freshman (i.e. first enrollment at MSU and less than 12 semester hours of transfer credit from any institution).

The population of junior college transfer students (N=60) was composed of all students initially enrolling at MSU on a full-time basis for the fall 1987 semester who had completed 12 or more semester hours at a regionally accredited junior college.

The data reported in this study were obtained by the Mississippi State University Office of Institutional Research from computerized official university student records. Specific data compiled for each individual included (a) classification as a native or transfer student, (b) composite ACT score, (c) major, (d) transfer QPA (where applicable), (e) cumulative QPA, (f) fall 1987 academic classification and (g) fall 1989 undergraduate status (i.e. graduated, enrolled or other).

The data were analyzed using descriptive and inferential statistics. The .05 alpha level was selected _a priori_ as the critical standard for all tests of significance. The use of inferential statistics was based on the assumption that the students included in this study were representative of past and future native and transfer undergraduate agriculture students at MSU. According to Oliver and Hinkle (1982, p.200), "Such an assumption permits the use of inferential statistics and, if made, must be defended by the researcher as being reasonable." Based on longitudinal studies of undergraduate MSU agriculture majors (Bowen and Lee, 1985; Taylor, 1989), the researchers felt that this assumption was warranted.

FINDINGS

The findings of this study are reported by objective.

Objective 1. The first objective of this study was to determine if significant differences existed between the composite ACT scores of native and transfer students. As indicated in Table 1, native students had achieved significantly higher mean ACT scores than had transfer students.

Table 1.

ACT Scores for Native and Transfer Students.

Group	n	x	S.D.	t	p
Native	60	20.53	4.32		
Transfer	60	17.08	5.04	4.03	.0001

In addition, within each department or program area having both native and transfer students, the native students had earned higher composite ACT scores than had the transfer students. These data are reported in Table 2.

Table 2.

ACT Scores for Native and Transfer Students Within Departments or Program Areas.

Department or Program	Group					
	Native			Transfer		
	n	x	S.D.	n	x	S.D.
Agricultural Economics	16	18.63	4.34	6	15.83	1.83
Agricultural & Extension Ed.	2	20.50	0.71	12	14.67	4.91
Ag. & Bio. Engn. Tech.	3	16.67	3.51	2	16.50	4.95
Agronomy	5	20.00	4.0[illegible]	0	---	---
Animal Science	6	22.67	4.7[illegible]	7	16.57	5.97
Biochemistry	3	27.33	1.53	2	20.00	1.41
Dairy Science	0	---	---	3	16.67	5.51
Entomology	0	---	---	1	18.00	---
General Agriculture	2	23.00	1.41	0	---	---
Horticulture	5	22.00	5.00	4	20.25	9.00
Landscape Architecture	13	19.62	3.23	9	18.11	4.14
Poultry Science	2	20.50	4.95	10	16.00	4.57
Preveterinary Medicine	3	24.33	2.08	4	23.25	3.50

Objective 2. The second objective was to determine if significant differences existed between the cumulative QPA of native and transfer students. Data in Table 3 indicate that no significant differences existed between the two groups on this variable.

Table 3.

Cumulative QPA for Native and Transfer Students.

Group	n	x	S.D.	t	p
Native	55	2.60	.68		
Transfer	58	2.57	.58	0.25	.8054

Analysis of Table 4 indicates that within departments or program areas differences did exist between the cumulative QPA of native and transfer students. In six cases native students had earned higher cumulative QPAs; in the remaining three cases, transfer students had earned higher cumulative QPAs.

Table 4.

Cumulative QPAs for Native and Transfer Students Within Departments or Program Areas.

Department or Program	Group					
	Native			Transfer		
	n	x	S.D.	n	x	S.D.
Agricultural Economics	14	2.71	0.73	6	2.46	0.61
Agricultural & Extension Ed.	2	3.06	0.08	10	2.39	0.50
Ag. & Bio. Engn. Tech.	3	2.13	0.11	2	1.75	0.91
Agronomy	4	2.47	0.81	0	---	---
Animal Science	5	3.05	0.20	7	2.52	0.49
Biochemistry	3	2.89	1.10	2	2.46	0.06
Dairy Science	0	---	---	3	2.73	0.43
Entomology	0	---	---	1	1.65	---
General Agriculture	2	2.83	1.18	0	---	---
Horticulture	5	2.64	0.39	4	3.22	0.43
Landscape Architecture	12	2.13	0.70	9	2.57	0.60
Poultry Science	2	2.77	0.45	10	2.52	0.49
Preveterinary Medicine	3	2.91	0.31	4	3.30	0.35

Objective 3. The final objective of this study was to determine if significant differences existed between native and transfer students in their level of persistence in completing an undergraduate agriculture degree at MSU. Table 5 indicates that a higher percentage of native students had completed undergraduate agriculture degrees than had transfer students. Transfer students composed a higher percentage of students in both the "enrolled" and "other" categories than did native students.

The chi square value of 6.04 (df=2, $p<.05$) indicated that undergraduate degree status was not independent of group membership (native vs. transfer). However, the contingency coefficient of .219 indicated that this relationship was low (Hinkle, Wiersma and Jurs, 1982).

Analysis of Table 6 indicates that within each department or program area a higher percentage of native students had graduated than had transfer students. Conversely, in each case a higher percentage of transfer students were in the "other" category than were native students.

Table 5.

Fall 1989 MSU Undergraduate Status for Native and Transfer Students.

	Undergraduate Status					
	Graduated		Enrolled		Other	
Group	n	%	n	%	n	%
Native	38	63.3	12	20.0	10	16.7
Transfer	25	41.7	16	26.7	19	31.7

Table 6.

Fall 1989 MSU Undergraduate Status for Native and Transfer Students Within Departments or Program Areas.

Department or Program Group	Undergraduate Status					
	Graduated		Enrolled		Other	
	n	%	n	%	n	%
Agricultural Economics						
Native	10	62.5	2	12.5	4	25.0
Transfer	3	50.0	0	0.0	3	50.0
Agricultural & Extension Ed.						
Native	2	100.0	0	0.0	0	0.0
Transfer	7	58.3	1	8.3	4	33.3
Ag. & Bio. Engn. Tech.						
Native	2	66.7	1	33.3	0	0.0
Transfer	0	0.0	1	50.0	1	50.0
Agronomy						
Native	5	100.0	0	0.0	0	0.0
Transfer	--	---	--	---	--	---
Animal Science						
Native	4	66.7	1	16.7	1	16.7
Transfer	1	14.3	4	57.1	2	28.6
Biochemistry						
Native	2	66.7	0	0.0	1	33.3
Transfer	0	0.0	1	50.0	1	50.0
Dairy Science						
Native	--	---	--	---	--	---
Transfer	3	100.0	0	0.0	0	0.0
Entomology						
Native	--	---	--	---	--	---
Transfer	0	0.0	0	0.0	1	100.0
General Agriculture						
Native	0	0.0	2	100.0	0	0.0
Transfer	--	---	--	---	--	---
Horticulture						
Native	5	100.0	0	0.0	0	0.0
Transfer	1	25.0	1	25.0	2	50.0
Landscape Architecture						
Native	5	38.5	4	30.8	4	30.8
Transfer	0	0.0	5	55.6	4	44.4
Poultry Science						
Native	2	100.0	0	0.0	0	0.0
Transfer	9	90.0	0	0.0	1	10.0
Preveterinary Medicine						
Native	1	33.3	2	66.7	0	0.0
Transfer	1	25.0	3	75.0	0	0.0

CONCLUSIONS

The purpose of this study was to compare native and transfer students on measures of academic aptitude, academic performance and undergraduate degree persistence. The following conclusions were made as a result of this study.

1. Native students have higher academic aptitude (as measured by composite ACT scores) than do transfer students. The magnitude of this difference is of both statistical and practical significance.

2. Native and transfer students are equal in academic performance (as measured by cumulative undergraduate QPA).

3. Native students who have persisted at MSU for two years are more likely to complete an undergraduate agriculture degree from MSU than are transfer students.

DISCUSSION

The finding that transfer students have a lower level of academic aptitude (as measured by composite ACT scores) than do native students is consistent with previous research (Cohen and Brawer, 1982; Grimes and Hausenfluck, 1980). Junior college and university entrance requirements may contribute to this situation. According to Cross (in Cohen and Brawer, 1982):

> The groups new to higher education . . . will be those of low socioeconomic status and those with low measured ability. The movement is already underway; the majority of students entering open-door community colleges come from the lower half of the high school classes . . . (p.36).

Based on ACT score requirements in effect for fall 1985, 38% (23 of 60) of the transfer students were not eligible for admission to MSU as new freshmen. This supports the contention by Cohen and Brawer (1982, p.48) that, "In states where public institutions of higher education are arrayed in hierarchical systems, most of the students begin in community college, and the proportion of lower-ability students is greatest in such colleges."

The finding that native and transfer students do not differ in cumulative undergraduate QPA is consistent with research by Grimes and Hausenfluck (1980). This finding is somewhat perplexing in view of the first finding which indicates that transfer students exhibit a lower level of academic aptitude (as measured by composite ACT scores) than do native students.

In an attempt to gain insight into these two seemingly contradictory findings, the relationship between composite ACT score and cumulative QPA was examined. Recommendations by Hinkle, Wiersma and Jurs (1982) were used to interpret the magnitude of the resulting correlation coefficients.

When all students (native and transfer) were included in the analysis, a low relationship (r=.41) was found to exist between composite ACT score and cumulative QPA. However, when analyses were conducted by group (native or transfer), different results were obtained. For native students, a moderate relationship (r=.57) existed between the two variables; for transfer students, little or no relationship (r=.30) existed between the two variables.

The amount of variance in cumulative QPA explained by composite ACT score ranged from a low of 9% for transfer students to a high of 32% for native students. This finding supports researchers (Cole and Bokor, 1989; Rudolph and Yoder, 1987) who have suggested that non-academic factors, such as personal aspirations, play a dominant role in determining success in postsecondary education. This appears to be especially true for junior college transfer students.

The finding that transfer students were less likely than native students to complete the bachelor's degree was consistent with research reported by Cohen and Brawer (1982). However, this finding was inconsistent with research by Grimes and Hausenfluck (1980).

Transfer students were almost twice as likely as native students to have neither graduated nor maintained enrollment at MSU. The non-persistence rate of approximately 32% for transfer students should be a major concern for faculty and administrators at both MSU and at the junior colleges.

IMPLICATIONS

The findings of this study have important implications for recruiting and advising junior college transfer students in undergraduate agriculture majors at MSU. Although junior college transfer students have lower composite ACT scores, they achieve cumulative QPAs which are equal to those earned by native students. This indicates that recruitment of junior college transfer students into agriculture majors at MSU is a legitimate method of maintaining and/or increasing student enrollment.

Junior college transfer students are less likely than native students to complete an undergraduate agriculture degree at MSU. Therefore, increased retention efforts targeted toward this group are warranted. In fact, one could question the ethics of increased recruitment efforts without corresponding increases in programs designed to enhance degree completion.

Further research should be conducted to determine factors related to degree persistence of both transfer and native students. The results of such research would provide a basis for the development and implementation of improved student retention programs.

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A COMPARISON OF NATIVE AND TRANSFER UNDERGRADUATE AGRICULTURE STUDENTS: ACADEMIC APTITUDE, ACHIEVEMENT AND DEGREE PERSISTENCE

A Critique

William G. Camp, Virginia Tech -- Discussant

The authors used existing institutional data to compare students entering Mississippi State University as freshmen in fall, 1985 with students entering as transfer students with 12 or more semester hours of credit in fall, 1987. The comparisons were made on pre-admission ACT scores, cumulative grade quality point average, and student status as of fall, 1989.

Strengths

The authors identified a study that had a realistic scope for non-funded research. This is often a problem with research in our field because inexperienced researchers fear that only major studies will be accepted as worthwhile. So-called "hip-pocket" research funding is very limiting and such research is inexpensive of necessity. Our younger colleagues need to understand that not all research needs to be large, funded projects.

The researchers used an existing data base for the study. Secondary analysis of extant data is a widely recognized and accepted practice in most research areas. As educational researchers we need to consider this kind of research more often.

The paper, though limited in length by the rules of this conference, contained a quite appropriate review of related literature. The authors found and reported other research findings regarding the variables in this study. Their own findings confirmed that earlier research and pointed out the consistency in a very direct way.

Concerns

The authors acknowledged the general inappropriateness of using inferential statistics on population data and made a reasonable case for its use. They made the argument that their population is merely a part of the longitudinal population of like students who came before and after the class of 1989. Even so, this is not a generally accepted practice. If the case of a longitudinal population is being made, perhaps a comparison of ACT scores across years would make it more convincing.

The native students were defined as entering freshmen from fall 1985 remaining in school in fall 1987. The transfer students were defined as initial enrollees in fall, 1987 with at least 12 semester hours credit from any other institution. On the surface, it would appear that the populations differ by definition. For example, how many of the entering transfer students were second semester freshmen or first semester sophomores? This seems to be a major assumption not warranted by the reported selection criteria.

Given the nature of institutional data, it is likely that more interesting information is available. For instance, if high school grade point averages, class rank, or family income were available, some very interesting research questions could be asked. Even with the data used, a more interesting question would be what relationship ACT scores had on persistence and achievement, while correcting for native/transfer differences.

HOW FIRM THE FOUNDATION?
A LOOK AT THE KNOWLEDGE BASE IN AGRICULTURAL EDUCATION RESEARCH

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INTRODUCTION

One of the first concepts taught in agricultural structures courses is the importance of a solid foundation. Buildings are only as good as their foundation. The same is true of research in agricultural education. Quality research is built on a solid knowledge base or theoretical foundation.

The importance of building vocational education research on a sound theoretical foundation has been receiving more emphasis in the past few years. Schultz (1988) asserted that only during the past five years have vocational educators addressed the issue of using theoretical/conceptual frameworks in vocational education research. Schultz's assertion is based on recent articles and activities emphasizing the need for a theoretical base for vocational education research (Lotto, 1983, McCullers, 1984).

The importance of using a theoretical/conceptual framework in vocational education research has been discussed by a number of agricultural education researchers. Burnett (1986) advanced the idea that the significance of the problem and the design of the research can be strengthened by use of a well developed theoretical/conceptual framework. Warmbrod (1986, p. 6) stated that "If we are more diligent to insure that research in vocational education is grounded more firmly on an appropriate and coherent theoretical/ conceptual framework, the degree of scholarship demonstrated in our research and in the reporting of that research, both orally and in writing, will increase substantially."

The question that springs forth is "Is agricultural education research based on a strong theoretical/ conceptual framework?" There are those who believe the answer is NO! In a presentation to the American Vocational Education Research Association Kapes and Bartley (1986) indicated that agricultural education research, as characterized by articles in the Journal of the American Association of Teacher Educators in Agriculture, were lacking in a theoretical/conceptual framework.

After reviewing several issues of the AATEA Journal, Thompson (1989, p.7) summarized what he had found in his keynote address to the Central Region Research Conference in Agricultural Education in Chicago, "I learned that date based pieces get published. Almost every article reflected careful attention to the drafting of hypotheses and the testing of the same. Almost no attention was directed to the source of the hypotheses and to the meaning of the results." When compared with other journals, Thompson (1989, p. 7) found that "They did a much better job of showing the location of the current research is related to previous work and to the theoretical notions of the field."

If Kapes, Bartley and Thompson are correct, the implications for agricultural education are serious. However, it is possible that Kapes, Bartley and Thompson are incorrect. Kapes and Bartley merely counted the number of citations in the various vocational journals and made their conclusions primarily on the number of citations, not who or what was cited. Thompson examined only five issues of the AATEA Journal in arriving at his conclusions.

A more detailed study of the research in agricultural education is needed to determine if the research is indeed lacking a solid theoretical/conceptual framework. If the foundation is deemed to be weak, as has been asserted, then the profession will need to take action.

PURPOSE AND OBJECTIVES

The purpose of the research was to determine if research in agricultural education has been built on a solid theoretical/conceptual framework. In order to do this it was necessary to identify who and what was being cited in agricultural education research. In order to operationalize the objectives of the study, two specific research questions were developed:

1. What documents are cited in the Journal of the American Association of Teacher Educators in Agriculture/Journal of Agricultural Education?

2. Who is cited in the Journal of the American Association of Teacher Educators in Agriculture/Journal of Agricultural Education?

PROCEDURES

All issues of the Journal of AATEA/Journal of Agricultural Education were collected that were published between January 1, 1977 and the Summer issue of 1991 (Volumes 18 through half of 32). The name of each person and each document that was cited in the articles was placed in a computerized data base (Dbase III Plus). An alphabetical listing of persons cited and documents cited were then printed and frequency counts were made. Since this was a complete population for the time period studied, no other statistical analysis was conducted.

RESULTS

Thirteen documents were cited ten or more times. Ten of the most frequently cited documents were concerned with research methodology or statistics. These documents include Miller and Smith's article in the Journal of Extension on how to handle nonresponses in survey research (24 citations) and Krejcie and Morgan's article in Educational and Psychological Measurement on determining sample size (19 citations). Other research/statistics publications included the SPSS manual (18 citations) and works by Dillman (12 citations), Campbell & Stanley (12 citations), Davis (12 citations) Borg & Gall (11 citations), Kerlinger (11 citations), Hinkle, Wiersma & Jurs (11 citations) and Warren, Klonglan and Sabri (10 citations). The authors and publications are found in Table 1.

There were only three non-research/statistics documents in the most cited category. These were Phipps' Handbook on Agricultural Education in Public Schools (28 citations, including 2 with Cook as the sole author), Craig's (now Camp's) supply and demand of vocational agriculture teacher studies (16 citations), and a 1977 study of supervised occupational experience programs conducted by David Williams (11 citations).

Writers who publish in the Journal of the American Association of Teacher Educators in Agriculture/Journal of Agricultural Education tend to cite agricultural educators and researcher/statisticians as opposed to educational theorists, adult education experts, curriculum specialists, etc. Larry Miller was cited 52 times (24 for his non-response article), Warmbrod was cited 41 times followed by Newcomb (38), Williams (37), Stewart (35), McCracken (34), and Cheek (32). Thirty one other individuals (excluding research methodologists and statisticians) were cited at least 10 times in the journal and are listed in Table 2. With seven exceptions (Rufus Stimson, Lloyd Phipps, Harold Binkley, Ralph Bender, Al Krebs, Benjamin Bloom and Ralph Bently) all the people cited are currently active in the agricultural education profession or in a related area. Of the seven exceptions, six are retired or deceased agricultural educators.

The most cited non-agricultural educator, non-statistician/research methodologist was Benjamin Bloom of Bloom's Taxonomy fame with 10 citations. He was followed by R. M. Steers (administration), L. W. Porter (organizational behavior) and Charles Prosser (early vocational education leader) who were cited nine times. E. E. Lawler (job satisfaction) had eight citations, John Dewey (educational philosophy), A. C. True (early agricultural leader) and Rupert Evans (vocational education philosopher and historian) were cited seven times. R. H. Ennis (critical thinking), H. J. Freudenberger (job burnout), I. B. Myers (personality testing), E. M. Rogers (diffusion of innovation), and E. M. Rempel (co-author of the Purdue Questionnaire with Bentley) were all cited six times.

CONCLUSIONS

Kapes, Bartley and Thompson appear to have been generally correct in their assessment of the use of theoretical/conceptual frameworks in agricultural education research. Simply put, the theoretical/conceptual foundation for research in agricultural education is deficient. There is considerable room for improvement. Of the 13 most cited documents, a person would question how many could be used in developing a theoretical/conceptual framework for research. Nationally recognized theorists who could contribute to the development of theoretical/conceptual frameworks in agricultural education are rarely cited. The profession does tend to cite, fairly heavily, statistical procedures and research methodology.

Agricultural educators do a respectable job of citing each other. While building on the research of others in the profession does help contribute to the development of a knowledge base and should be encouraged, one needs to be a careful in relying solely on this to establish the foundation for a study. Often the work cited may not be adequate for building a foundation or is research that was not originally built on a theoretical/conceptual foundation.

In the keynote address to the Southern Agricultural Education Research Conference in 1986, Warmbrod indicated that research in agricultural education had made tremendous strides during the past couple of decades. He said the research design and statistical procedures had improved in sophistication and increased in quality. However, he warned of over emphasizing these components of the research process and forgetting about such considerations as the significance of the problem being researched. This advice coupled with his remarks about the importance of the theoretical/conceptual framework cited earlier need to be heeded by the profession.

If research in agricultural education is to be truly useful, it must examine the significant problems facing the profession and be built on a solid theoretical/conceptual foundation. The resulting findings can then be used to improved practice in agricultural education which will lead to additional research and more theory building. The professional will be on a continuous upward spiral. As Thompson (1989, p. 9) put it, "Our research, I am suggesting, should begin with a look at theory and end there." It currently isn't!

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Warmbrod, J. R. (1986). Priorities for continuing progress in research in agricultural education. Proceedings 35th Southern Region Research Conference in Agricultural Education. March 22-24, 1986, Little Rock, Arkansas.

Table 1

Documents That Have Been Cited at Least Ten Times in the Journal of AATEA/Journal of Agricultural Education, 1977-1991

Citations	Author	Document and Publication Information
28	Phipps, L. J. (Cook & Osborne)	Handbook on Agricultural Education in Public Schools, Danville, Il.
24	Miller, L. E. Smith, K.	Handling Nonresponse Issues Journal of Extension, 1983, 21 (5), 11-13.
19	Krejcie, R. V. Morgan, D. W.	Determining Sample Size for Research Activities, Educational and Psychological Measurement, 1970, 30.
18	Nie, Hull, Steinbrenner, Jenkins, & Bent	Statistical Package for the Social Sciences, New York: McGraw Hill Book.
16	Craig, D. G. Camp, W. G.	A National Study of the Supply and Demand for Teachers of Vocational Agriculture, University of Tennessee (1971, 1976, 1977, 1979, 1980, 1982, 1983), Virginia Tech (1988, 1989).
12	Dillman, D. A.	Mail and Telephone Surveys: The Total Design Method, New York: John Wiley.
12	Campbell, D. T. Stanley, L. C.	Experimental and Quasi-Experimental Designs for Education, Chicago: Rand McNally.
12	Davis, J. A.	Elementary Survey Analysis, Englewood, NJ: Prentice Hall
11	Williams, D.L.	A Study of Supervised Occupational Experience Programs of Iowa Vocational Agriculture Students, Ames: Iowa State University, 1977.
11	Borg & Gall	Educational Research, New York: Longman.
11	Kerlinger, F. N.	Foundations of Behavior Research, New York: Holt, Rinehart and Winston.
11	Hinkle, Wiersma, Jurs	Applied Statistics for Behavioral Sciences, Boston: Houghton Mifflin.
10	Warren, P. D. Klonglan, G. E. Sabri, M.M.	The Certainty Method: Its Application and Usefulness in Developing Empirical Measures in Social Sciences, Rural Sociology Report No. 82, Ames: Iowa State University, 1969.

Table 2

Educators Who Have Been Cited at Least Ten Times in the Journal of AATEA/Journal of Agricultural Education, 1977-1991[a]

Educator	Number of Citations
Miller, Larry	52
Warmbrod, Bob	41
Newcomb, L H	38
Williams, David	37
Stewart, Bob	35
McCracken, J. David	34
Cheek, Jimmy	32
Moore, Gary	28
Phipps, Lloyd	28
McGhee, Max	27
Smith, Keith	26
Shinn, Glen	24
Stimson, Rufus	23
Arrington, Larry	21
Lee, Jasper	20
Barrick, Kirby	18
Crunkilton, John	18
Binkley, Harold	17
Camp, Bill	17
Craig, David	17
Foster, Rick	17
Iverson, Maynard	16
Bender, Ralph	15
Cepica, Marvin	15
Miller, Wade	15
Knight, Jim	14
Bowen, Blannie	13
Henderson, Jan	13
Brown, Ron	12
Krebs, Al	12
Bentley, Ralph	11
Cole, Lee	11
Kotrlik, Joe	11
Rawls, Willie	11
Bloom, B. S.	10
McMillion, Martin	10
Richardson, William	10
Sutphin, Dean	10
Kahler, Alan	10

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[a] statisticians and authors of research books have been omitted

How Firm the Foundation? A Look at the Knowledge Base in Agricultural Education Research

A Critique

Carl L. Reynolds, University of Wyoming--Discussant

In this research report is presented an interesting summary of "Who's Who" in agricultural education research. The question asked, "Is agricultural education research based on a strong theoretical framework?" is one that should continually be addressed by the profession. The need for this study is well established.

It was reported and concluded in the study that recognized experts in the areas of statistics and research methodology were heavily cited in agricultural education research. On that issue, agricultural educators can be proud of their efforts.

The procedures followed in this study are well defined and understood. However, the question that keeps coming to mind is this: Does the determination of what was cited and who is cited in the Journal of the AATEA/Journal of Agricultural Education fully answer the research questions? This problem of determining whether our research is based on a solid theoretical/conceptual framework appears to be much more complex. Since it can be argued that agricultural education utilizes the concepts adopted from many disciplines, it seems important to know how frequently, our research reports included references to psychological principles, learning theory, curriculum development, and human behavior to name a few. The author did point out that the number of non-agricultural educator citations was quite low by comparison. It would be interesting to determine how many times authors of research reports have developed a theoretical/conceptual foundation for an investigation and failed to cite the appropriate theorist(s) whose principles were taken for granted as generally accepted knowledge.

The point is well taken that, from the findings presented, agricultural educators may be guilty of citing each other too often and failing to rely adequately upon other disciplines.

The researcher is to be commended for calling our attention to a most important concern which should result in improved status of our research efforts. Wouldn't it be nice to attend an AERA meeting in the near future and hear frequent citations of research reports conducted by agricultural educators!

A STRUCTURE FOR A RESEARCH AGENDA FOR AGRICULTURAL EDUCATION: A NATIONAL DELPHI INVOLVING INTERNAL EXPERTS

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INTRODUCTION

Humans are set apart by the ability to solve problems--to do research. Hamlin (1966) described research as ". . . an unusually stubborn and persisting effort to think straight which involves the gathering and the intelligent use of relevant data" (p.14). Kerlinger (1986) defined research as a "systematic, controlled, empirical, and critical investigation of natural phenomena guided by theory and hypotheses. . ." (p.10). Warmbrod (1986) recommended ". . . we pay greater attention to the significance and importance of the problems and issues that we research" (p. 9). Is our research guided, thoughtful, and important?

External decision makers tied to agricultural education have the perception that our research lacks focus; that it is soft and not systematic (Buriak and Shinn, 1989). Whether the perception is true or otherwise, the question remains; Do we identify, prioritize and research important problems and issues that are a part of a collective and systematic effort?

Purposes and Objectives

The purpose of this investigation was to evaluate internally the mission and initiatives identified by Deans and Directors (Buriak and Shinn, 1989), and arrive at a consensus document providing structure for research in agricultural education. This document could be used to 1) communicate initiatives to planners, external decision makers, and the broader research community, and, 2) develop an agenda that could fit into the structure of the Planning and Budget Subcommittee of the Experiment Station Committee on Organization and Policy (ESCOP).

Procedures

Delphi was the method most congruent with the purposes of the study. Selection of internal experts paralleled the method used to select external experts in the initial study by Buriak and Shinn (1989). The top 100 research institutions listed in The Chronicle of Higher Education (1987) that had programs of agricultural education were included in the analyses (N = 31).

The Round 1 questionnaire was developed by compiling the consensus responses of the Deans and Directors (Buriak and Shinn, 1989). Round 1 was sent to the Department Head in each of the 31 institutions with instructions to review the document collectively with their faculty. The intent of Round 1 was to review the mission statement and validate the research initiatives identified by the external advisors.

Round 2 was developed from the responses to the Round 1 instrument. Content analysis was used to bring structure to the Round 1 responses. The format for Round 2 was patterned after the classification system for the Current Research Information System (CRIS) database. Departments were asked to develop open-ended research objectives, fitting them into the described format. Examples were provided to guide formatting. The Round 2 responses were presented to the 1990 NCA-24 committee, seeking advice on whether to proceed with a third round or attempt to consolidate the Round 2 responses into the structure, again using content analysis techniques. The NCA-24 committee recommended moving directly to the consolidation phase. Consequently, the planned third round was not conducted.

Findings

Mission. Agricultural education refers to the processes of education applied to the body of knowledge generally defined as agriculture. It includes: needs assessment; teaching approaches; curricula and program development; instructional and program delivery approaches; application of technologies; program and instructional evaluation; appropriateness of education; history, philosophy, and policy issues related to education in and about agriculture, and institutional organizations in domestic and international settings.

Research in agricultural education should build upon the existing professional knowledge base that includes theoretical, developmental, and applied inquiry. Agricultural education is accountable for teaching, research, and public service activities. To fulfill these responsibilities, the profession must conduct research about learning and teaching; curricula development; delivery methodologies; and, assessment of program relevance and effectiveness.

Research Initiatives: The research agenda was structured into research problem areas (RPA), research activities (RA), and research objectives (RO) to facilitate communications. The initiatives and structure appear in Figure 1.

Figure 1. Research Problem Areas, Activities, and Objectives

RPA 1.0 Knowledge Base for Learning and Teaching

RA 1.1 Critical Thinking and Problem Solving

RO 1.1.1 Metacognition
RO 1.1.2 Experience
RO 1.1.3 Sources of information
RO 1.1.4 Curricula structure
RO 1.1.5 Teaching techniques

RA 1.2 Individual Achievement

RO 1.2.1 Motivation, Self-concept, and Individual Difference
RO 1.2.2 Climate
RO 1.2.3 Teacher-Learner Interactions
RO 1.2.4 Quality of Instruction
RO 1.2.5 Leadership and Organizational Development

RA 1.3 Professional Preparation and Competence

RO 1.3.1 Prerequisite Experience and Qualifications
RO 1.3.2 Career Development Theory
RO 1.3.3 Ethics and Values
RO 1.3.4 Administration and Organizational Development

RPA 2.0 Curricula and Program Planning

RA 2.1 Teaching Basic and Academic Skills

RO 2.1.1 Agricultural Literacy
RO 2.1.2 Integration of Basic and Academic Skills
RO 2.1.3 Infusion of Science and Mathematics
RO 2.1.4 Infusion of Communications and Language
RO 2.1.5 Infusion of Social Values
RO 2.1.6 Economics, Entrepreneurship, and Free Enterprise
RO 2.1.7 Guidance and Counseling

RA 2.2 Needs of Future Agricultural Workforce

RO 2.2.1 Demographic Analysis
RO 2.2.2 Employment, Supply-Demand, and Nature of Workforce
RO 2.2.3 Job Satisfaction
RO 2.2.4 Global Market Demands
RO 2.2.5 Gender, Race, and Diversity
RO 2.2.6 Specific Training Needs

RPA 3.0 Delivery Methodologies

RA 3.1 Educational Methodologies for Learning and Teaching

RO 3.1.1 Learning Style - Teaching Style Interactions
RO 3.1.2 Cooperative Learning and Peer Teaching
RO 3.1.3 Experiential Methods including Youth Groups
RO 3.1.4 Methods for Special Populations
RO 3.1.5 Evaluation Techniques

RA 3.2 Innovative Instructional Technologies

RO 3.2.1 Innovation, Adoption, and Diffusion of Technology
RO 3.2.2 Expert Systems and Knowledge Representation
RO 3.2.3 Learner-Client Technology Preference
RO 3.2.4 Articulation Strategies

RPA 4.0 Program Relevance and Effectiveness

RA 4.1 History, Philosophy, Futuring, and Policy

RO 4.1.1 Historic Perspectives and Social Change
RO 4.1.2 Philosophical Bases of Agricultural Education
RO 4.1.3 Values and Ethics
RO 4.1.4 Future Roles
RO 4.1.5 Policy Development

RA 4.2 Faculty and Staff Development

RO 4.2.1 Needs Assessment
RO 4.2.2 Structures and Organizations
RO 4.2.3 Undergraduate and Graduate Curricula
RO 4.2.4 Qualitative Results and Impact
RO 4.2.5 Perceptions, Satisfaction, and Retention

RA 4.3 Evaluation of Teaching/Programs

RO 4.3.1 Program Impacts
RO 4.3.2 Program Change
RO 4.3.3 Communications Methods
RO 4.3.4 Curricula Designs
RO 4.3.5 Follow-up of Program Completers
RO 4.3.6 Program Evaluation and Accreditation

Conclusions

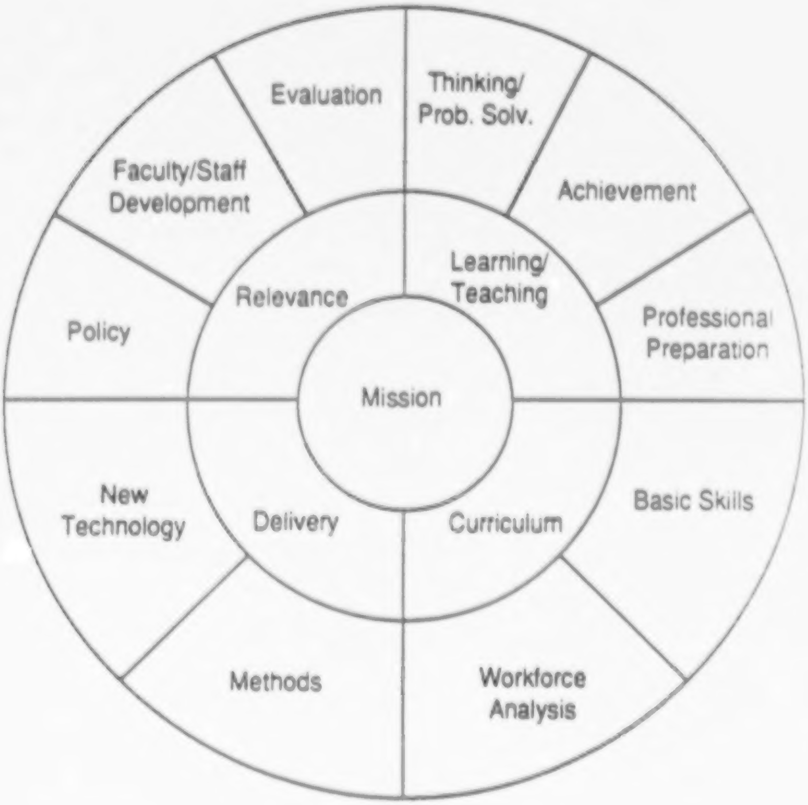
Deans and Directors concurred that research in agricultural education should build upon the existing professional knowledge base that includes theoretical, developmental, and applied inquiry (Buriak and Shinn, 1989). Internal advisors, i.e. Department Heads and Faculty, reached a consensus on a research mission and concurred with the opinions of Deans and Directors regarding the mission.

There was lack of consensus by the internal experts with the perceptions of the Deans and Directors on the ratings of individual research initiatives. The ratings of initiatives by internal experts were more similar to the ratings found by Stewart, Shinn, and Richardson (1977), and Silva-Guerrero and Sutphin (1990) than to those of Buriak and Shinn (1989). Internal experts did not provide convergence of the initiatives, rather an expansion of initiatives resulted from Round 2. In effect, the additional initiatives made the structure developed by Buriak and Shinn (1989) more like the structure developed by Stewart, et al., and Silva-Guerrero and Sutphin. Speculation regarding these differences is beyond the bounds of this investigation.

A principal finding of the study of Deans and Directors was that research in Agricultural Education lacked focus (Buriak and Shinn, 1989). This second study conducted internal to the profession confirmed this finding. The Researchers conclude that internal experts in Agricultural Education are either reluctant or incapable of focusing research initiatives within a structure (CRIS) compatible to that of other agricultural disciplines. Reasons for the demonstrated inability to focus research con not be determined from the results of this study.

The proposed structure shown in Figure 1 is a structured content analysis and condensation done by the Researchers of the categories and initiatives forwarded by both internal and external experts. From this structure, the model shown in Figure 2 was developed.

Figure 2. A Structure for a Research Agenda For Agricultural Education


Evaluation
Thinking/ Prob. Solv.
Achievement
Professional Preparation
Basic Skills
Workforce Analysis
Methods
New Technology
Policy
Faculty/Staff Development
Relevance
Learning/ Teaching
Curriculum
Delivery
Mission

Research initiatives for agricultural education can be grouped into a structure similar to the CRIS database used by ESCOP (See Figure 1). The process of structuring and identifying a research agenda can be valuable 1) for maintaining compatibility with the national priorities for the food and agricultural science system and the educational system, 2) for guiding our research investments, and 3) for communicating our priorities to agencies and organizations which have national responsibilities to plan and budget research.

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A Structure for a Research Agenda for Agricultural Education: A National Delphi Involving Internal Experts

A Critique

Carl L. Reynolds, University of Wyoming--Discussant

This research report is a commendable effort on the part of the researchers to continue to add information concerning the research agenda in agricultural education. It is especially important to note that the design consisted of using internal experts as the source of information that serves as an excellent followup of the first study in which external experts were utilized. The procedures followed were well documented and recognized as appropriate and sound in the report published by the same authors in 1989.

As an example of utilizing seldomly used research tools found in most agricultural education research (Delphi, content analysis) this report is a valuable contribution to the profession. The report of the research problem areas, activities, and objectives, organized into a logical structure was a most helpful presentation of findings to aid in understanding the research agenda identified by internal experts. I'm sure there are many research problems within our profession in which difficulty of quantifying data prevents us from accomplishing our goals of making significant contributions to the knowledge base within our field.

The summary of the findings of this research report plus those of the previous report referenced by the same authors provided an excellent description of a structural model for research in agricultural education. It was with some difficulty, however, to follow the logic of other conclusions proposed because of findings referenced in the conclusions that did not appear in the findings section of the paper. It has often been the reaction of this discussant that paper length limitations limits severely the ability of authors to present essential components of research findings.

Overall, the researchers are to be commended for an excellent research effort that contributes a major piece of knowledge to provide the profession with a roadmap for future research efforts.

A TRI-STATE ASSESSMENT OF CURRENT ATTITUDES TOWARD BIOTECHNOLOGY HELD BY TEACHERS OF AGRICULTURE IN THE PUBLIC SCHOOLS

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INTRODUCTION

Biotechnology is defined as "using living organisms to improve or develop products or processes useful to mankind" (Savage, 1987). Bread, cheese, beer and wine, yogurt and recycled water are common examples. Recent advances in biotechnology, such as genetic engineering, tissue culture, and fermentation engineering, promise a second "green revolution" for agriculture (Sattelle, 1990; Schneiderman, 1987). A nationwide Louis Harris poll commissioned by the U.S. Office of Technology Assessment (1987) found that only 16% of Americans rated their basic understanding of science and technology as "very good" while 23% were "very interested" in technological matters. Eighty percent of Americans expected future development in science and technology to benefit them. At the same time 71% expected that these developments would pose some risks; however, 62% felt that benefits outweighed risks and just 28% believed that risks outweighed benefits. Two-thirds of the public believed that genetic engineering would make life better for all people.

Barton (1987) found that leadership groups are generally more informed about biotechnology than the general public, and are more likely to see that benefits outweigh risks. Hoban (1990) reported in a major study conducted in North Carolina that public knowledge of genetic engineering is generally low. Since agricultural educators will likely serve a vital role as interpreters of biotechnology to their students and to their communities, it is important that teachers of agriculture understand and have appropriate attitudes (e.g., willingness to study the issues, acceptance of new concepts, etc.) toward the subject. At present, not much is known about teacher attitudes toward the new biotechnology. Martin, et. al. (1989) in a national study, and Malpiedi-Kirby (1990) in North Carolina, found generally positive teacher attitudes toward agriscience instruction in agricultural education, of which the new biotechnology is a part. State leaders need reliable data on which to plan preservice and inservice education programs on biotechnology and related curriculum development. Therefore, baseline data such as in this study are needed to fill the void.

PURPOSE AND OBJECTIVES

The primary purpose of the study was to determine the attitudes of teachers of agriculture toward biotechnology. Specific objectives were to: a) determine teacher interest in biotechnology; b) assess teacher knowledge of biotechnology; c) learn the information sources teachers use to gain knowledge of biotechnology; d) ascertain teacher acceptance of biotechnology; and e) consider the effects of demographics on teacher attitudes toward biotechnology.

PROCEDURES

This was a descriptive study involving self-assessment on a structured written instrument. The population consisted of teachers of agriculture in the states of Georgia, Maryland and Tennessee. Questionnaires were distributed to those teachers of agriculture attending their respective summer inservice conferences. Social Security numbers on the returns were used to identify respondents. To insure that the sample was representative of the population, a mailed follow-up was made to a 50% random sample of nonrespondents. Response from the initial mailing was 51.4%. After four weeks, a telephone follow-up was made to a 10% random sample of nonrespondents. When no significant differences were noted on 15 demographic and response variables, the data from those responding to the follow-ups were combined with the returns from the original respondents. Thus, nearly two-thirds (422 or 66.3%) of the teachers of agriculture in the three states provided data for the study.

Data were collected using the Inventory of Biotechnology in Agricultural Education, as developed by the researchers from the literature and their own education/experience. The Inventory was made up of four sections: Introduction/Directions, Personal Interest in and Knowledge of Biotechnology, Professional Preparation/Involvement in Biotechnology, and Demographics. The instrument was reviewed for content validity by a panel of experts from The University of Georgia who were involved in research, agriculture, education and biotechnology; their suggestions were incorporated into the final version of the questionnaire. The instrument was trial tested for readability with the 26 enrollees in a graduate course in Agricultural Education. Data were collected during the late summer and fall of 1990. Analysis revealed high reliability -- a Cronbach's alpha of .87 for all parts.

ANALYSIS OF DATA

Primarily descriptive statistics -- count, means, medians, frequencies, percentages and Chi square -- were used to analyze the data. Significant differences in means were determined by using t-tests and analysis of variance.

RESULTS

Demographics. Respondents ranged in age from 22-70 years; median age was 39.5 years. Females made up just 7.3% of respondents. Ninety-three percent of the group were Caucasian; the largest minority group was African-American at 4.8%; the next largest minority was American Indian at 1.7%. Most respondents (50.9%) held masters degrees; 36.5% had bachelors degrees, 8.0% had education specialist degrees and just 2.9% had doctorates. Respondents originated primarily (83%) from the states of Georgia, Maryland, and Tennessee. Experience levels ranged from less than one year to

44 years; the median was 11 years. One-fifth (22.3%) reported experience in teaching other subjects, while eight out of ten (79%) reported other experience, including farming, government, and industry. Most respondents (89.7%) were in A, AA or AAA schools; but 10.3% were in very large systems (AAAA). Median enrollment was 100 students in agriculture. One-half (51.3%) of all participants were in single teacher departments. Agricultural production (50.7%), agricultural mechanics (46.9%) and horticulture (35.3%) were the most common specialties reported. Most respondents (72.5%) were employed for 12 months; however, 16% were on 10 month contracts.

Interest and knowledge levels. Mean ratings of perceived interest and knowledge may be viewed in Table 1. In every category mean interest levels were significantly higher ($p<.05$) than mean knowledge levels.

Sources of knowledge. The major sources of information on the new biotechnology used by teachers of agriculture in the three states were as follows: newspapers, 79.6%; agricultural journals, 79.4%; television, 63.5%; inservice workshops, 34.4%; education journals, 32.9%; radio, 31.3%; graduate courses, 15.6%; undergraduate courses, 14.0%; and employment in biotechnology, 5.7%. The providers of information on biotechnology that were most trusted by respondents are indicated in Table 2.

Table 1
Level of interest in and knowledge of biotechnology held by teachers of agriculture ($N=422$)

	Interest			Knowledge			
Category	n	M[a]	SD	n	M[a]	SD	Sig.•
Animal Biotechnology	404	4.1	1.1	411	2.8	1.1	.0001
Plant Biotechnology	404	4.0	1.1	411	2.6	1.0	.0001
Regulations and Safety	400	3.5	1.1	409	2.2	1.0	.0001
Bio-chemical Production/ Modification of Materials	405	3.4	1.1	411	2.0	1.0	.0001
Waste Management and Treatment	401	3.4	1.2	408	1.9	1.0	.0001
Human Health Care	402	3.2	1.2	408	2.1	1.1	.0001
Bioengineering	402	2.[illegible]	1.3	407	1.9	1.0	.0001

[a]Note: means are on a scale of 1=low;...5=high.
•Level of significance between means of interest and knowledge, using the t-test.

Acceptance of biotechnology. Nearly all (98.8%) of the respondents said that they would use a product developed through biotechnology, primarily because of its greater effectiveness and safety, and the recommendations of experts. Respondents also thought that 97.9% of their colleagues would use these products, for similar reasons.

Table 2
Most trusted providers of information reported by teachers of agriculture (N=422)

Category	n	%	M[a]	SD
University/college	329	78.0	3.9	1.2
Agricultural journals/newsletters	323	76.5	3.6	1.1
Cooperative Extension Service	316	75.0	3.5	1.1
Education journals/newsletters	303	71.8	3.2	1.1
U.S. government agencies	319	75.6	3.2	1.2
Colleagues	313	74.2	3.1	1.1
State government agencies	307	72.7	3.1	1.1
Companies selling biotechnology products/services	312	73.9	2.6	1.2
Other	14	3.3	2.1	1.7

[a] Means are based on a scale of 1 = low...5 = high.

Most respondents (78.9%) reported that modern biotechnology was being incorporated into the agriculture curriculum. The major means of incorporation are detailed, by state, in Table 3.

Table 3
Methods reported by teachers for incorporation of biotechnology into the agriculture curriculum (N=422)

Method of Incorporation	All		Georgia		Maryland		Tennessee	
	n	%	n	%	n	%	n	%
Infused into regular agriculture classes	224	53.1	87	48.9	37	59.7	99	55.3
Units on biotechnology are taught in selected classes	95	22.5	25	14.0	19	30.6	50	27.9
Selected lessons on biotechnology are taught in all classes	87	20.6	27	15.2	18	29.0	42	23.5
Courses in biotechnology are taught on quarter, semester, or annual bases	16	3.8	6	3.4	7	11.3	3	1.7
Other	16	3.8	5	2.8	2	3.2	9	5.0

Note: Totals exceed 100% because some respondents checked more than one category.

Respondents indicated that their plans for changes in the curriculum were as follows: a) to add emphasis, 69.4%; b) to keep about the same emphasis, 29.5%; and c) to reduce emphasis, 1%. These data and state totals are indicated in Table 4.

Table 4
Planned changes in the curriculum reported by respondents (N=422)

Response	All		Georgia		Maryland		Tennessee	
	n	%	n	%	n	%	n	%
Add emphasis in biotechnology	275	69.4	118	71.1	51	82.3	105	62.9
Keep about the same emphasis	117	29.5	46	27.7	11	17.7	60	35.9
Reduce emphasis on biotechnology	4	1.0	2	1.2	0	0.0	2	1.2

The extent to which factors affected respondents' decisions to teach biotechnology is reflected in Table 5. Availability of teaching materials and funding for equipment and supplies were leading factors; however, inservice preparation and ability levels of students were also moderately important to respondents.

Table 5
Factors affecting respondents' decisions to teach biotechnology (N=422)

Factor	All			Georgia			Maryland			Tennessee			F
	n	M[a]	SD	n	M[a]	SD	n	M[a]	SD	n	M[a]	SD	
Availability of teaching materials	327	3.9	1.2	127	3.8	1.2	49	4.3	1.0	149	3.9	1.2	2.45
Funding for equipment/ supplies	314	3.9	1.3	120	3.8	1.3	49	4.0	1.2	143	3.9	1.3	0.09
Provisions for inservice/ update training	321	3.6	1.4	126	3.7	1.3	50	4.1	1.1	143	3.3	1.4	9.08*
Ability level of students	328	3.5	1.4	126	3.3	1.5	49	3.7	1.5	151	3.6	1.3	2.49
Preparation time	314	3.1	1.3	122	3.1	1.4	49	3.2	1.4	141	3.0	1.2	0.75
Size of classes/enrollment	306	2.5	1.4	117	2.4	1.4	49	2.6	1.5	138	2.5	1.3	0.01
Community attitudes toward biotechnology	296	2.4	1.3	115	2.5	1.3	46	1.9	1.3	133	2.4	1.3	3.22*
Other	17	2.9	1.5	7	3.7	1.7	2	1.0	0.0	8	2.6	0.9	3.54

[a] Means are on a scale of 1 = little... 5 = much.

*Significant at the .05 level.

Respondents' evaluations of the extent to which biotechnology would affect various aspects of the program are displayed in Table 6. Enhanced student knowledge of agriculture and improved prestige of the program were seen as positive results by a majority of respondents; SAEP and FFA activities were believed to be less affected.

Table 6
Effects of biotechnology in the curriculum on various aspects of the local Agricultural Education program as perceived by respondents (N=422)

Aspects of Program	Perceived Effect Little. . . . . Much n	1	2	3	4	5	M	SD
Student understanding of agriculture	346	42	33	101	109	61	3.3	1.2
Prestige for the program	331	62	39	86	88	56	3.1	1.3
Recruitment of students	340	106	45	90	55	44	2.7	1.4
Student retention	317	70	64	96	59	28	2.7	1.2
Supervised Agricultural Experience Programs	330	112	66	82	55	15	2.4	1.2
FFA activities	331	116	74	94	37	10	2.2	1.1
Other	12	8	0	2	1	1	1.9	1.4

Effects of demographics. Chi square and t-tests were used to determine if the demographic variables -- state of residence, age, years of teaching agriculture, educational level, years of farming, size of school, student enrollment in agriculture, number of agriculture teachers in the school, and length of contract -- affected ratings of the various response variables. Few significant differences were found, and these may have occurred due to the effects of missing data and small cell size or by chance alone because of multiple comparisons (Oliver and Hinkle, 1981).

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Teachers of agriculture in the three states were most interested in and knowledgeable about animal and plant biotechnology; they were only moderately attuned to the other areas. This was most likely due to the teachers' greater preparation and experience in the animal and plant sciences. Teachers were more interested in the seven areas of biotechnology than their perceived knowledge levels would indicate; this shows a need for improved preservice and inservice education relating to this emerging field.

The vast majority of teachers named the mass media -- newspapers, agricultural journals, and television -- as major sources of information on biotechnology. This was consistent with the findings of Malpiedi-Kirby (1990). Thus greater effort should be made by agricultural educators to provide factual information to the popular press, as well as to increase the availability of information on biotechnology through workshops and formal classes. Because teachers trust colleges and universities the most as providers of information, teacher educators should exert leadership in the discovery and dissemination of knowledge about the teaching and communicating of biotechnology in Agricultural Education. They should also involve experts on scientific applications of biotechnology at inservice workshops and classes for teachers of agriculture and for preservice students.

Teachers of agriculture in the three states generally accepted biotechnology, both personally and professionally -- but they indicated a need for help in incorporating the concepts into their programs. Teacher educators and state supervisory staffs should coordinate planning for implementation of instruction, including strategies for overcoming negative factors and capitalizing on the positive attitudes teachers of agriculture have toward biotechnology.

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A Tri-State Assessment of Current Attitudes Toward Biotechnology Held by Teachers of Agriculture in the Public Schools

A Critique

Carl L. Reynolds, University of Wyoming--Discussant

This study was a most timely, thorough, and well conducted study that adds an important piece of information to the research knowledge in the profession. It would be hard to argue against the idea that teachers' attitudes toward the instruction of a new technology is one of the first pieces of information that teacher educators and state leaders need to know before planning preservice and inservice programs. The objectives, design and procedures, and results were presented in a most clear straightforward manner. The followup procedure, random mailing to non-respondents followed by a telephone followup and then comparing the responses of non-respondents with respondents deserves commendation.

The implications of the results should have significant impact on the profession. First, the need for inservice was well established based upon teachers' expressed level of interest compared with a perceived low level of knowledge of biotechnology. An important result, the major source of information upon which teachers rely, the mass media, suggests that agricultural educators use non-traditional methods to deliver inservice. Because most of the profession relies on the traditional summer course on campus or regional workshops to deliver inservice programs, this particular finding deserves the most discussion.

It might well be suggested also, even though this item was not included in this research, that teacher educators create an increased need for inservice on new and emerging technology topics because of the time delay in adjusting the preservice curriculum to reflect current needs expressed by teachers.

We would be remiss if the profession does not utilize the information presented in this excellent research report.

EARLY AGRICULTURAL EDUCATION TEACHER EDUCATION 1900-1917

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INTRODUCTION

From 1900 to the passage of the Smith-Hughes Act in February, 1917, the teaching of agriculture at both the elementary and secondary levels grew dramatically. In 1906-07, less than 100 public secondary schools offered instruction in agriculture. By 1915-16, over 3,600 secondary schools offered agricultural instruction to more than 73,000 students. Because of such increases, there were more openings than available teachers could fill.

A lack of uniformity existed because none of the programs received federal support. Along with diversity in directed programs, several different possible sources of teachers were also identified. Among these proposed sources were converted science teachers and college of agriculture graduates.

Many leaders in both education and agriculture proposed several solutions to the problem created by the shortage of teachers. These various solutions also created conflicts between such organizations as normal schools and land-grant universities as well as raising philosophical conflicts over the role of minority teachers and the utility of practice or student teaching.

PURPOSE AND OBJECTIVES

The purpose of the study was to examine the various teacher education programs between 1900 to 1917 for the purpose of preparing agricultural education teachers.

Specific objectives of the study were to:

1. Identify the different agricultural education teacher education programs offered.

2. Identify the federal legislation affecting agricultural education teacher education proposed and passed prior to 1917.

3. Identify the early experiences used as a forerunner to student teaching in agricultural education teacher education.

4. Identify the issues resolved by agricultural education teacher educators during this era.

5. Draw implications for contemporary agricultural education teacher education from the 16-year period immediately preceding passage of the Smith-Hughes Act.

PROCEDURE

Historical research methods were utilized to accomplish the objectives of the study. Both primary and secondary sources were utilized to obtain the information needed. Primary sources included mass media publications, minutes of Congressional committees, texts of federal legislation, and speeches given by prominent leaders. Secondary sources included United States Department of Agriculture publications, United States Office of Education publications, books, and journal articles. Information was collected at such locations as the Library of Congress, National Agriculture Library, and the United States Department of Education library. Sources were examined for both internal and external criticism.

RESULTS/FINDINGS

Several different teacher education programs for agricultural education teachers were proposed. Among the proposals were converting nature-study teachers, using college of agriculture graduates, converting high school science teachers, and using people raised on farms. All proposed ideas had the advantage of meeting the suddenly dramatic need for agriculture teachers in the early 1900s. There were, however, disadvantages associated with each proposal.

Bailey (1908) criticized the nature-study teacher conversion concept because nature-study was not a subject or even a method. It was also noted that agriculture had an economic base, while nature-study did not. The proposal for using college of agriculture graduates who did not have education courses was criticized by Bricker (1914) because such individuals would lack knowledge of teaching methods and an understanding of the maturity level of high school students. Converting high school science teachers to agriculture teachers was not recommended because the teachers were believed to teach a pure science while agriculture was perceived as representing an applied science. The proposal of using people raised on farms as agriculture teachers was also criticized. Bricker (1914) believed this to be the worse alternative possible. He believed if being raised on a farm was the prospective teacher's only qualification, then they definitely should not be employed.

With such strong criticism of proposed solutions for the preparation of agriculture teachers, other alternatives had to be found. One piece of federal legislation which helped in the agriculture teacher preparation process was the Nelson Amendment of 1907. This amendment to the Agricultural Appropriations Bill permitted $25,000 of federal funds to be used by colleges of agriculture to prepare teachers of agriculture and mechanics arts.

By 1908, a conflict between normal schools and colleges of agriculture came into existence. Through the proposed Burkett bill, federal funding would go to normal schools to prepare agriculture teachers. As might be expected, the Colleges of Agriculture lobbied strongly against this bill. A compromise was reached between land-grant colleges and normal schools--the former was to prepare secondary agriculture teachers, and the latter was to prepare elementary agriculture teachers. As a consequence of the compromise, the Burkett bill was not passed by Congress. However, support for vocational teacher preparation by normal schools appeared in vocational education bills for a number of years after 1908.

True (1912) noted strong nation-wide support for practice teaching in the preparation of agriculture teachers. At that time, numerous models were suggested for the practice teaching format. Among the suggestions were (a) cooperative efforts between the colleges of agriculture and nearby normal schools, (b) experience at secondary schools of agriculture, (c) practice teach in neighboring high schools, (d) practice teach in model secondary agricultural schools on campus, (e) practice teacher in short courses, and (f) use a fellowship program where practice teachers were paid by both the college of agriculture and the school employing them. In 1916, the New York College of Education established an apprenticeship training program through cooperative arrangements with the State Department of Education placing seniors in high schools where there was a full-time agricultural education teacher.

Works (1916) noted the problems of being a pioneer in a new field. He suggested that the best alternative would be to form a department of agricultural education where prospective teachers could gain both technical and pedagogical skills.

CONCLUSIONS, IMPLICATIONS, AND/OR RECOMMENDATIONS

The forerunners of today's agricultural education teacher educators had to make many decisions laying the groundwork for the field. Contemporary teacher educators have benefitted from those early decisions. Possibly the most important decision was to maintain high standards for teacher preparation. It could have been easy to compromise standards and permit people with just farm backgrounds or science teachers or nature-study teachers to enter the profession. However, such compromises were not made and precedents were set on the standards for teacher preparation that influenced the requirements of the Smith-Hughes Act.

After a degree of experimentation, a practical teaching experience, commonly called practice teaching, student teaching or apprenticeship teaching, was perfected. It proved to be a valuable experience and almost universal to its use. If teacher educators of 70-80 years ago had not experimented with such an experience, later teacher educators may have had a difficult time justifying an experience that is almost universally used today.

The decisions made and trends established with the pioneer teacher educators in the 1900-1917 era established a strong foundation for agricultural education teacher education. The authors of the Smith-Hughes Act helped to continue these trends. Today's teacher educators need to look carefully at the same trends and glean out their strong points and maintain them.

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EARLY AGRICULTURAL EDUCATION TEACHER EDUCATION 1900-1917

A critique

Earl B. Russell, University of Illinois -- Discussant

The authors are commended for examining the early evolution of agricultural teacher education in the United States. They point out an aspect of our history which many of us may not have clearly understood or appreciated before. The focus, objectives,and methodology were well framed by the authors. For the most part, findings were addressed rather well in their discussion of results, and conclusions were based on the data presented. The paper is informative.

Interestingly, many of the issues cited as being debated early in this century are similar to those under debate today! For example, the long-standing issues of type of professional preparation and the type of technical preparation in the field to be taught have been further inflamed in recent years by initiatives from the Holmes Group and the highly publicized "Teach for America" program, created by a 1989 graduate from Princeton.

Regarding questions or suggestions for improvement, I will offer a few observations. I was especially eager to read the findings associated with objective number four, which was to "identify the issues resolved by agricultural education teacher educators during this era." Recalling issues in our profession which have been debated during my career, I remember relatively few which have been resolved, and I was eager to learn which ones were by our predecessors. However, some of the agricultural teacher education issues prior to 1917 which, by implication, were resolved by the passage of federal legislation to standardize the preparation of agriculture teachers, were not in fact resolved. They have been debated to various degrees throughout the history of our profession, as will be apparent later in this session.

One point made in the introduction to this paper was reference to the lack of uniformity in teacher education programs because none of them in the early days received federal support. The implication here is that the pursuit of uniformity is a desirable goal, but I can't help but wonder whether uniformity of teacher preparation programs based on federal legislation is a good or a bad principle from which to operate. Something about the nature of legislatively driven uniformity strikes at the heart of experimentation and creativity among program planners and dreamers. Why assume the merit of uniformity?

THE UNDERGRADUATE PREPARATION OF AGRICULTURAL EDUCATION TEACHERS: WHAT TRANSCRIPTS REVEAL

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INTRODUCTION

Changes in society have had and continue to have great impact on vocational education. Several examples of change in the workplace include the increased need for employees with basic skills competence (Lotto, 1988), greater need for employees that are computer literate (Rosenfeld, 1988), and a need for employees that can work efficiently as members of teams and take more individual initiative in the workplace (Bailey, 1990). These trends and needs as well as others have strong implications for vocational education in areas such as program planning, curriculum development, instruction, and teacher preparation.

Additional changes are also having a profound impact on vocational teacher preparation. Building upon the numerous studies and reports related to education reform in the United States were several critical examinations of teacher education. For example, Tomorrow's Teachers (Holmes Group, 1986) and A Nation Prepared: Teachers for the 21st Century (Carnegie Forum on Education and the Economy, 1986) recommended that a bachelor's degree in the arts and sciences serve as a prerequisite for the professional study of teaching. Focusing more directly on vocational teacher education, The Unfinished Agenda (National Commission on Secondary Vocational Education, 1985) recommendations indicated that vocational education teachers should attain the same level of education as their academic teacher counterparts. A recent report (Lynch, 1990) has confirmed that the reform movement is indeed having an impact on vocational teacher education programs. The greatest changes appear to be increases in student entrance and exit requirements, an increase in the time associated with field-based internships and student teaching, and an increase in the number of general education or liberal studies courses required (Lynch, 1990, p. 142). Several institutions reported that movement was being made toward a fifth-year or postbaccalaureate program. Indeed, the teacher education reform movement coupled with state budget crises has stimulated several universities to abolish their undergraduate teacher education programs (Diegmueller, 1991).

These pressures raise several questions about what university vocational teacher education programs can and should be. Should these programs culminate in a baccalaureate degree or require postbaccalaureate studies? How many courses and experiences in general or liberal studies, teacher preparation studies, and teaching content area studies (e.g., agriculture, business, marketing) should be included in a program? To what extent are current programs providing a reasonable and acceptable set of courses and experiences?

Unfortunately, these questions all relate to a more basic question: What is the optimum mix of preparation studies and experiences for vocational teachers (Finch, 1991)? Concern about the preparation of teachers in general and vocational teachers in particular is well documented. For example, Beyer, Feinberg, Pagano, and Whitson (1989) question the divisions between educational and liberal studies that many of the teacher education reformers take for granted. The authors contend that "teacher education is not so far removed from liberal education as present-day reformers would suppose" (Beyer et al., 1989, p. 1). Lynch and Griggs (1989), likewise, take issue with reformers' views of teacher education. They question the notion that a degree in arts and sciences (or in subject matter that is most appropriate for vocational education) will ensure success in teaching a particular vocational subject.

PURPOSE AND OBJECTIVES

The primary purpose of this research was to document the coursework agricultural education teachers completed during their university teacher preparation studies. The information presented on courses taken should not be interpreted as any sort of mandate or deficiency; rather, it should be viewed as status information which, together with information from other sources, can assist teacher educators, administrators, and policy makers in determining what the optimum mix of coursework and experiences should be for vocational teacher education programs. This mix should logically emerge from a close examination of vocational teacher preparation's current status as well as the evolving nature of the workplace (Bailey, 1990; Lotto, 1988; Rosenfeld, 1988); vocational education teachers' changing professional roles (Finch, 1991; Lynch, 1990); and, philosophical and knowledge base considerations (Griggs & Burnham, 1988; Lynch & Griggs, 1989).

The objectives of this research were to:

1. Determine the types and amounts of coursework prospective agricultural education teachers take as part of their teacher preparation (i.e., mathematics and computer science; social science; English; science; language, fine arts, other humanities, and philosophy; teaching major; and education).
2. Compare the coursework taken by prospective agricultural education teachers with that taken by other vocational education teachers (business, home economics, marketing, technology [formerly industrial arts] and trade and industrial education).
3. Compare the preparation of agricultural education teachers with that of teachers reported in other studies (i.e., Galambos, Cornett, & Spitler, 1985; Koerner, 1963).

This study was based on two important assumptions associated with university coursetaking. They were:

1. Coursetaking can provide the student with a body of specific knowledge that, in turn, serves as a prerequisite to postuniversity employment success. This in no way infers a causal relationship between coursetaking and employment success. Additionally, no assumption is made that teachers only learn content by taking university courses.
2. Lower level (or division) university courses serve as foundations and prerequisites for enrollment in upper level courses. As such, lower level general education studies can provide foundational knowledge for both upper level general education and teaching major courses.

PROCEDURES

Typically, any analysis of educational coursework is constrained by access to transcripts. National Center for Research in Vocational Education (NCRVE) researchers overcame this problem through close collaboration with the Southern Regional Educational Board (SREB). The SREB is linked closely to states and universities in the southeastern United States and thus has access to many types of institutional information. Essentially, the methodology used in this study paralleled research conducted by SREB and funded by the National Endowment for the Humanities (Galambos, Cornett, & Spitler, 1985). The SREB study focused on an analysis of transcripts of arts and sciences teaching graduates and arts and sciences graduates. This study extends our knowledge about preparation for teaching through transcript analysis of vocational teacher education graduates. Data for agricultural teachers was gathered as a part of the overall study which included study of five other teaching areas: business, marketing, home economics, technology, and trade and industrial education.

Initially, SREB and NCRVE convened a steering group for the purpose of identifying potential universities to participate in the study and assisting in formulating more detailed research questions. The steering group consisted of education professionals in state departments of education, vocational teacher education programs, and local education agencies.

From among SREB member states, institutions were identified that offered degrees leading to certification as vocational education teachers. Institutions producing the largest number of vocational education teachers were identified to serve as a pool from which participating institutions were chosen. From this pool, the largest producer of vocational teachers from each of the several subject areas was asked to participate. Additional institutions were then selected giving consideration to geographical representation, quantity of teachers produced, teaching area(s) teachers are prepared for, and a reasonably equal distribution of teachers produced by service area. Each institution was then contacted by SREB and asked to participate. Transcripts for 1988-1989 graduates were then obtained from each of the participating institutions.

A coding scheme was developed that took into account individual university courses in relation to general course groupings. This scheme was adapted from the earlier SREB study and based on input provided by the project steering group, information provided by individual institutions, and an examination of institution catalogs. After transcripts were examined and coded, relevant transcript information was entered onto computer discs for later analysis. From the 22 universities that participated in the overall study, 412 transcripts were analyzed and coded. This included 82 agricultural education teacher transcripts from 16 universities.

Data were analyzed using standard statistical packages available for use with microcomputers. Means, ranges, and percentages were computed for courses taken in various categories and by teaching area.

RESULTS

Coursework completed by prospective agricultural education teachers is shown in Table 1. The teachers completed an average of 57.7 semester hours or 39.3% of the total credits in general studies (the first five areas in Table 1). These credits tended to be at the lower level and 35.5% of the coursework in general studies was transferred from other institutions.

Table 1

Types and Total Credits of Coursework Completed by Prospective Agricultural Education Teachers (N - 82)

	Average Credits				
			Transfer		
Coursework Area	Lower[a]	Upper[a]	Lower	Upper	Total
Mathematics & Computer Science	7.7	0.2	2.8	0.1	7.9
Social Science	13.7	2.2	5.4	0.1	15.9
English	10.5	0.7	4.3	0.1	11.2
Science	15.2	0.3	5.4	0.2	15.5
Language, Fine Arts, Other Humanities, & Philosophy	6.0	1.2	2.0	0.1	7.2
Physical Education & Health	3.6	0.4	1.2	0.0	4.0
Teaching Major					
Content in education[b]	0.6	6.8	0.0	0.0	7.4
Content outside education[c]	23.2	25.1	5.7	1.5	48.3
Education					
General methods	0.5	2.2	0.0	0.0	2.7
Methods in teaching major	0.0	4.1	0.0	0.0	4.1
Practicum	0.3	1.1	0.0	0.1	1.4
Student teaching	---	9.1	---	0.0	9.1
Other[d]	2.0	6.7	0.2	0.2	8.7
Designated other[e]	1.9	0.4	1.3	0.1	2.3
Not classified	1.1	0.0	0.3	0.0	1.1
Total average credits	86.3	60.5	28.6	2.6	146.8

[a] Lower level courses are those with numerical prefixes indicating that they are primarily for freshman and sophomore level students. Upper level courses are those with numerical prefixes indicating that they are primarily for junior and senior level students.

[b] Content in education includes courses with an education prefix that are teaching major courses but which do not have "methods" or "teaching" in their titles.

[c] Content outside education includes courses related to the technical field of agriculture such as animal science courses.

[d] Other education includes courses such as psychology of education and social foundation courses.

[e] Designated other courses are those providing technical preparation outside the teaching major of agriculture such as accounting courses.

The prospective teachers completed an average of 55.7 semester hours or 37.9% of the total credits in the teaching major. Most of the teaching area related content was taken outside of education at the institution where the degree was awarded.

In the coursework area of education, the graduates completed 26 semester hours or 17.7% of the total credits. The remaining credits (7.4) were earned in physical education and health, designated other, or work not classified in a coursework area.

The coursework taken by prospective vocational education teachers is shown below. On the average, the vocational education teachers other than agriculture completed 58.6 semester hours in general studies, 49.1 hours in the teaching major, 28.6 hours in education, and 8.5 hours in other studies. The agricultural education teachers completed, on average, about one hour less in general studies, about one hour less in other, about two and one half hours less in education, and about six and one half hours more in the teaching major as compared to other vocational teachers.

	Semester hours				
Major	General Studies	Teaching Major	Education	Other	Total
Agriculture	57.7	55.7	26.0	7.4	146.8
Business	63.5	47.8	31.2	6.2	148.7
Home Economics	60.0	53.3	26.5	7.8	147.6
Marketing	59.1	44.8	31.8	7.5	143.2
Technology	55.4	50.5	27.5	10.7	144.1
Trade and Industrial	55.1	49.1	25.9	10.5	140.6

A detailed analysis of the general studies area revealed that agricultural education teachers completed about the same number of credits as the average for other vocational teachers in mathematics and computer science; English; and language, fine arts, other humanities, and philosophy. The agricultural education teachers completed 5.4 semester hours more science and 5.0 semester hours less social science than other vocational teachers.

Table 2 shows a comparison of the results of this study with that of teachers reported in other studies. The hours of coursework taken in mathematics and English by prospective agricultural education teachers were similar to the hours taken by other teachers and arts and sciences graduates. The agricultural teachers completed more science and less social science and less language, fine arts, other humanities and philosophy than the comparison groups. The education and student teaching coursework hours were similar for general teacher and agriculture teacher groups.

CONCLUSIONS AND RECOMMENDATIONS

With regard to the types and amounts of coursework taken, it appears that prospective agricultural education teachers follow the typical coursetaking patterns found in most universities. The teaching major area reflects a large number of credits. General studies and education credits appear to parallel internal (i.e., university) and external (e.g.,

Table 2

Comparison of Semester Hours of Coursework Taken by Teachers, 1963, 1982-83, and 1988-89

Coursework area	Koerner Findings, 1963 Secondary Teachers	SREB Study Group, 1982-83 Teachers	SREB Study Group, 1982-83 Arts and Sciences Graduates	NCRVE/SREB Study, 1990 Agricultural Teachers
Mathematics[a]	3	6	7.2	7.9[b]
Social Science[a]	--	21.6	20.4	15.9
English[a]	12	11.3	11.8	11.2
Science[a]	11	11.6	12.2	15.5
Language, Fine Arts, Other Humanities, and Philosophy[a]	--	11.4	17.8	7.2
Education	27.6	28.3[c,d]	--	26.0
Student teaching	7	9[d]	--	9.1

[a] General education.
[b] Also includes computer science courses.
[c] Excludes additional hours in transferred credits.
[d] Secondary teachers only.

NCATE,regional accreditation agency) requirements. Of note is the large average total hours of credit accumulated by the graduates. This confirms the notion that "four year" degrees demand four and one half or five year commitments.

When the coursework taken by prospective agricultural teachers was compared with other vocational teachers some variation did exist. The agricultural teachers completed more coursework in science and in the teaching major and less work in social science than other vocational teachers.

The preparation of agricultural teachers compared favorably with that of teachers and arts and sciences graduates reported in other studies (see Table 2). The hours of coursework taken differed little in mathematics and English. The greater emphasis on coursework in science and lesser emphasis on social science and language, fine arts, other humanities and philosophy by agricultural teachers is related appropriately to the content being taught in agricultural education programs. Education and student teaching were similar for general teacher and agricultural teacher groups. It may be concluded that agricultural education graduates are on par with other teachers in terms of general and education coursework taken.

It is recommended that research be conducted to determine the specific content of courses taken in mathematics, science, and English by prospective agricultural education teachers. It is also recommended that studies be conducted to determine the extent to which the teaching major courses require the use of basic academic skills.

Although the methodology used in this study is cumbersome and very time consuming, it was found that transcript analysis revealed information about students' coursetaking patterns that was, heretofore, unavailable. Teacher education institutions should consider the possibility of periodically conducting transcript analyses of their graduates in order to obtain a more complete picture of the courses agricultural education majors take. This information may, in turn, provide faculty members with useful input for future agricultural teacher education curriculum changes.

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THE UNDERGRADUATE PREPARATION OF AGRICULTURAL EDUCATION TEACHERS: WHAT TRANSCRIPTS REVEAL

A Critique

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This paper gets high marks for compiling what represents a "status study" of the degree to which agricultural teacher education majors compare with those who prepare to teach other vocational subjects and with teachers prepared in other fields of education. The study included graduates from the 1988-89 academic year, providing a useful benchmark for future studies which may examine changes in course patterns over time. The three objectives in the study were clearly stated as well as investigated and reported. Results reported clearly correspond to the objectives, and the conclusions are based on the findings. The authors describe the methodology used in the study as cumbersome and time-consuming, and on that point there can be little disagreement! Again, the authors are to be commended for clearly and briefly presenting a quite complex investigation.

The finding that agricultural teachers showed greater preparation in science and lesser emphasis on social sciences may possibly be explained by the increased emphasis in the late 1980s on incorporating more "agricultural science" into secondary agricultural programs. As educational and social trends evolve over the coming decade, this study could provide a useful benchmark to study possible shifts in the current pattern of coursework as content emphases change in the future.

Finally, and facetiously, I challenge the researchers to take the next step which they proposed under the statement of purpose to put this study together with information "from other sources" and tell teacher educators, administrators, and policy makers what the **optimum** mix of coursework and experiences should be for those enrolled in agricultural teacher education programs.This strikes me as a more rhetorical than realistic use of such research, because seldom do teacher educators, administrators, and policy makers reach agreement on what would be an "optimum mix" of the complex ingredients required to produce the types of vocational teachers needed in the future. It is the complexity of the issue, coupled with ever-changing economic, social, and political concerns which keep the debate about "optimum mix" alive and well. We all eagerly await such a report.!

WHO SHOULD BE RESPONSIBLE FOR COORDINATING, DELIVERING, AND FUNDING PRESERVICE VOCATIONAL TEACHER PREPARATION PROGRAMS?

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INTRODUCTION

Teacher education is undergoing many changes which could have far reaching implications on how future teachers are prepared to enter the profession. At issue is who should be responsible for providing teacher preservice preparation programs.

Current trends indicate that colleges of education will have a reduced role in future preservice teacher preparation activities (Schussler and Testa, 1984). According to Roth (1989), growing disrespect for teacher education has resulted in states restricting teacher education programs at colleges and universities, the development of alternative teacher preparation and certification programs, and local school districts assuming more teacher education activities. Teacher empowerment and the actions of strong professional organizations have also diminished the control of universities and colleges over preservice teacher preparation programs (Crunkilton and Hemp, 1982).

A shortage of agriculture teachers has resulted in a variety of alternative teacher certification programs designed to prepare individuals who do not have a teacher education background to enter the profession (McCracken, 1982). Such alternative certification programs are usually school-based and may or may not include participation by institutions of higher education (Association of Teacher Educators, 1989). Goodlad (1990) stated that many proponents of alternative certification of teachers seem to support the notion that general education, subject matter courses, and mentoring under an experienced teacher are sufficient for preparing teachers; therefore undergraduate teacher education programs should be eliminated.

Local school districts are assuming more authority for teacher preparation from colleges and universities as the districts are forced to fill the void left by the declining influence of colleges of education (Parramore,1986; Schussler and Testa, 1984). According to Roth (1989), one option currently being explored and discussed is moving teacher education out of colleges and universities altogether and into local schools.

Strong professional associations are becoming more influential in how teachers are prepared and certified (Crunkilton and Hemp, 1982). For example, the National Education Association supports the establishment of state professional standards boards with authority for approval of preservice teacher education and certification programs (Ohio Education Association, 1987, p. 12). The creation of a state standards board, with a majority of members being public school teachers, is a stated priority of the Ohio Education Association. This board would have power to prescribe standards for approval of teacher education programs and would assume the responsibility for funding preservice teacher preparation (Ohio Education Association, 1990).

Feistritzer (1984) reported that state departments of education influence teacher education by regulating what coursework is required of prospective teachers. Several states have recently imposed limits on the number of credits in professional education required of prospective teachers in an effort to remove the "obstacles" for those who would enter the profession (Roth, 1989). Roth wrote that "whether or not [state imposed limits are] the beginning of a trend is not yet clear, but the teacher education community should observe developments closely" (p. 321).

The literature indicates that teacher education is viewed as a responsibility of several different education groups. Branch (1984) contends that university teacher education departments share responsibilities for preparing teachers with state legislatures, professional organizations, state departments of education, local schools, accrediting agencies, and community citizens. Anderson (1988) identified four groups as having vocational teacher preparation responsibilities: 1) state vocational education agency staff, 2) vocational teacher educators, 3) vocational education teachers, and 4) school vocational education administrators. In recent years, much emphasis has also been placed on the involvement of business and industry in the total education system.

As different groups, each with its own agenda, become increasingly involved in the teacher preparation process, questions of roles and responsibilities arise as does the potential for conflict. However, Schussler and Testa (1984) pointed out that there appears to be little collaboration among state departments, school districts, and universities relative to needed change, division of responsibilities, and planning.

There is clearly a need for the vocational education groups to reach consensus regarding responsibilities for teacher preparation programs in order to maintain uniform and adequate standards for future teachers. Needed is an understanding of which groups should be responsible for coordinating, delivering, and funding teacher preparation programs. A first step in reaching this understanding is to determine the current perceptions regarding these responsibilities.

PURPOSE AND OBJECTIVES

This paper is based on part of a study which was designed to provide data useful in developing a comprehensive professional development program for Ohio vocational teachers. This program includes preservice as well as inservice education.

The objective on which this paper is based was to determine the perceptions of Ohio vocational educators regarding the levels of coordination, delivery, and funding responsibilities that six partners have for preservice degree and non-degree granting vocational teacher preparation programs in the state. The six partners were identified based on the literature and include: 1) state Division of Vocational and Career Education (DVCE), 2) vocational teacher education departments at universities and colleges, 3) secondary vocational education teachers, 4) school districts or Vocational Education Planning Districts (VEPD), 5) professional associations, and 6) vocational education program industries.

For clarification, the following definitions are offered:
VEPD = A cooperative arrangement among several school districts for the purpose of providing vocational education programs that could not be provided by the separate districts.
Preservice (degree) program = Baccalaureate program in vocational teacher education at the university level designed to prepare individuals to teach in one of the following secondary vocational programs: agriculture, business, home economics, marketing, or trades and industries. A standard certificate in the occupational area is recommended upon successful completion of the program.
Preservice (non-degree) program = Program in vocational teacher education designed to supplement an individual's occupational expertise with knowledge and skills necessary to teach vocational education programs. A one-year certificate in the specified occupational program is issued upon entry into the profession.

PROCEDURES

Questionnaires were mailed to four populations of Ohio vocational education groups and a random sample of Ohio vocational education teachers teaching during the 1990-91 school year. The populations and sample included: 1) vocational teacher educators at universities and colleges (N=72), 2) DVCE personnel with preservice teacher education program responsibilities (N=76), 3) local vocational education administrators including local supervisors, vocational education directors, and VEPD superintendents (N=511), and 4) secondary vocational teachers (n=547).

The populations and sample received a cover letter, coded questionnaire, and a stamped return envelope. Following a mailed reminder and a second mailed questionnaire to non-respondents, 788 questionnaires (65%) were returned. A t-test indicated no significant differences between early and late respondents on selected responses. Therefore, the responses are generalized to the populations and sample (Miller and Smith, 1983).

Respondents ranked the six partners' levels of responsibility for coordinating, delivering, and funding preservice degree and non-degree granting programs by assigning each partner a score of one to indicate primary (51% or more) responsibility, a two to indicate a shared major (49% or less) responsibility, or no score which indicated only a shared minor or no responsibility.

Content and face validity of the survey instrument was assured through a review and revision process involving vocational teacher educators and former vocational teachers. A Cronbach's alpha was calculated for each scale measuring coordination, delivery, and funding responsibilities of the partners. Reliability coefficients ranged from .69 to .82 for the items measuring perceived responsibilities of the DVCE, teacher education departments, and school districts and VEPDs. Reliability coefficients for the items measuring perceived responsibilities of teachers and professional associations ranged from .63 to .67 except for the items measuring teachers' perceived funding responsibility which was .78. Reliability coefficients for the items measuring responsibilities of program industries were .54 for the delivery responsibility, .66 for coordination, and .73 for funding. The researchers' decision to include data on the perceived responsibilities of professional associations and program industries was justified by the fact that these areas were not included in the study by Anderson (1988). Therefore, the lower reliability measures were accepted on these new areas of study.

ANALYSIS OF DATA

The data were analyzed using the Statistical Package for the Social Sciences. Statistical procedures included calculating means, frequencies, and a Cramer's V statistic for each respondent group.

For analysis purposes, the rating scale was inverted so that a rating of two indicated a primary responsibility and a one indicated a shared major responsibility. Mean rating scores assigned by respondent groups to each partner were calculated. A mean of .00 to .49 for a partner was considered to indicate minor or no responsibility. A mean of .50 to 1.49 was considered to indicate the partner had a major responsibility. A mean above 1.49 was considered to indicate a primary responsibility.

RESULTS

Data analysis revealed only low or negligible association between respondent employment position and perceived responsibility levels of the six partners (Davis, 1971). Results are reported for perceived level of partners' coordination, delivery, and funding responsibilities for degree and non-degree granting preservice programs. These results are illustrated in Table 1.

Vocational program industries and professional education associations were perceived by all respondent groups to have only minor or no responsibilities for both degree and non-degree granting programs.

Vocational teachers were perceived to have only minor or no coordination and delivery responsibilities for both programs. However, local vocational administrators and DVCE personnel reported teachers' funding responsibility to be major while vocational teachers and teacher educators reported this responsibility to be minor for both programs.

School districts and VEPDs were perceived to have minor coordination, delivery, and funding responsibilities for both degree and non-degree granting programs by the respondent groups

Table 1

Mean Perceived Ratings of Ohio Vocational Education Partners' Coordination, Delivery, and Funding Responsibility Levels for Preservice Vocational Teacher Preparation Programs

	Preservice (Degree)			Preservice (Non-degree)		
	Coor.	Del.	Fund	Coor.	Del.	Fund
Respondent Groups						
Partner:	**DVCE**			**DVCE**		
Teachers	1.01	.56	1.18	1.01	.59	1.18
Local Administrators	1.03	.40	.97	1.13	1.10	.44
Teacher Educators	.61	.23	1.03	1.00	.41	1.52
DVCE Staff	.80	.28	.45	1.32	.54	.67
Partner:	**Teacher Ed. Dept.**			**Teacher Ed. Dept.**		
Teachers	1.21	1.51	.49	.91	1.19	.35
Local Administrators	1.37	1.82	.44	1.10	1.56	.32
Teacher Educators	1.82	1.95	1.16	1.44	1.74	.46
DVCE Staff	1.70	1.90	1.03	1.18	1.62	.71
Partner:	**Teachers**			**Teachers**		
Teachers	.16	.11	.33	.16	.10	.28
Local Administrators	.05	.03	.79	.04	.04	.68
Teacher Educators	.02	.04	.31	.01	.02	.26
DVCE Staff	.06	.10	.69	.04	.12	.71
Partner:	**Schools/VEPD**			**Schools/VEPD**		
Teachers	.26	.24	.43	.44	.47	.56
Local Administrators	.33	.29	.35	.44	.39	.51
Teacher Educators	.13	.10	.07	.20	.15	.17
DVCE Staff	.12	.12	.33	.18	.24	.43
Partner:	**Prof. Assoc.**			**Prof. Assoc.**		
Teachers	.12	.21	.11	.19	.23	.13
Local Administrators	.05	.08	.03	.11	.10	.04
Teacher Educators	.00	.04	.00	.04	.11	.09
DVCE Staff	.08	.08	.08	.08	.10	.14
Partner:	**Program Industry**			**Program Industry**		
Teachers	.10	.09	.16	.15	.19	.18
Local Administrators	.02	.07	.07	.03	.08	.09
Teacher Educators	.00	.00	.09	.02	.00	.13
DVCE Staff	.02	.02	.04	.06	.02	.12

Scale:

0.00 - 0.49 = shares minor or no responsibility
0.50 - 1.49 = shares major responsibility
1.50 - 2.00 = has primary responsibility

Descriptors:

Coor. = Coordination
Del. = Delivery
Fund = Funding

except vocational teachers and local administrators. These two groups perceived school districts and VEPDs to have a major funding responsibility for non-degree programs.

University and college vocational teacher education departments were perceived by all respondent groups to have either primary or major coordination and delivery responsibilities for both degree and non-degree granting programs. Teacher education departments were perceived to have minor funding responsibility for degree granting programs by the vocational teachers and local administrators. DVCE personnel and teacher educators perceived this funding responsibility to be major. For non-degree granting programs, the DVCE personnel perceived teacher education departments to have a major funding responsibility while the other respondent groups perceived this responsibility to be minor.

The DVCE was perceived by all respondent groups except the DVCE personnel to have either major or primary coordination and funding responsibilities for both the degree and non-degree granting programs. The DVCE personnel perceived the funding responsibility for degree granting programs to be minor. The vocational teachers were the only respondent group to report the DVCE as having a major delivery responsibility for degree granting programs. The other respondent groups indicated DVCE responsibility in this area to be minor. For delivering non-degree granting programs, the vocational teacher educators reported the DVCE to have minor responsibility while the other respondents reported the responsibility to be major.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions and recommendations are made regarding Ohio vocational teacher education. No attempt to generalize beyond the time of the study nor the study population is implied.

Despite calls by teachers and professional associations for more input into the teacher preparation process (Crunkilton and Hemp, 1982; OEA, 1990), vocational teachers and professional associations are viewed as having low levels of responsibility for preservice programs. However, vocational teachers do place a higher level of responsibility on professional associations than do the other vocational education groups.

The results do not indicate a perceived shift to any great degree in preservice responsibilities to local school districts or VEPDs as is indicated in the literature (Parramore,1986; Roth, 1989). School districts and VEPDs are seen as having more responsibilities in non-degree than in degree granting programs, but, again, not to the extent of that described in the literature (Parramore,1986; Goodlad, 1990). Vocational teachers and local administrators perceive the preservice responsibility levels of school districts and VEPDs to be higher than do teacher educators and DVCE personnel who have roles in preservice programs.

Vocational education program industries are viewed as having little responsibility for preservice programs. However, vocational teachers do tend to place more responsibility on the industries than do the other vocational education groups.

Supporting the literature (Feistritzer, 1984; Branch, 1984; Anderson, 1988), the study results indicate that the state DVCE is thought to have a relatively high level of responsibility for providing preservice programs. The DVCE is perceived to have a higher level of responsibility for non-degree than for degree granting programs. Despite the DVCE personnel viewing teacher education departments as being most responsible for funding, the DVCE is generally viewed as being the main source of funds for both programs.

Vocational teacher education departments at colleges and universities are perceived to have higher levels of responsibilities for degree granting than for non-degree granting programs, although their responsibility levels for both programs are thought to be high. Teacher education departments are seen as being primarily responsible for the coordination and delivery of preservice programs.

Based on the conclusions, the responsibility for coordinating and delivering preservice degree and non-degree granting programs should lie primarily with teacher education departments. The DVCE should shoulder most responsibility for funding these programs. However, lines of communication should remain open among all vocational education groups assuring input from several sources. Consideration should be given to the possibility that there may be more effective ways of providing preservice programs which include partners taking on roles that have traditionally been held by others.

Regardless of changes underway in teacher preparation and calls for more input from other education groups, teacher education departments are still seen as being the primary source for preparing beginning vocational teachers. However, this situation may change. If the trend of diffusing teacher preparation responsibilities as indicated by the literature strengthens, vocational teacher educators will work more closely with state departments of education and in collaboration with school districts and professional associations in preparing new teachers.

Agricultural educators are typically competent in technical and teaching skills. However, today's leaders in the profession must also possess those skills needed to work within the policy making process to affect changes regarded as positive to the profession. While decisions regarding teacher education should not be based solely on thoughts of the way things should be, the perceptions of those affected by the decisions cannot be ignored. Securing the support of the education community is an essential part of making teacher education initiatives successful.

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WHO SHOULD BE RESPONSIBLE FOR COORDINATING, DELIVERING, AND FUNDING PRESERVICE VOCATIONAL TEACHER PREPARATION PROGRAMS?

A Critique

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This paper examines perceptions of people concerned to varying degrees with the preparation of vocational teachers. While it is not specifically focused on agricultural education, it has clear implications for our field. The paper begins with a sound conceptual base from the literature, followed by a careful presentation of methods, findings, and conclusions. A number of trends in teacher education are cited, although some of them may be little more than issues or "trial balloons" being floated in recent literature. Some of the "trends" actually look a lot like some of the old issues being debated early in the century, as reported in the previous paper by Hillison and Herren.

Further, this paper helps to clarify roles and responsibilities of those involved in or having a stake in teacher education. It could provide a basis for bringing interested parties together to strengthen collaborative efforts.

Now I will turn to questions and suggestions for consideration by the researchers. First, the matter of nonrespondents was not adequately addressed by stating the similarity between early respondents and late respondents. Overall, there was only a 65 percent return rate. This means that over one-third of those surveyed were not heard from, and this group could be systematically different than those who did respond. It overreaches the data to go ahead and generalize the findings to the entire populations and sample. A more appropriate procedure would have been to telephone a 10 percent random sample of nonrespondents, and compare their responses to the others before making a decision to generalize.

The data analysis section described the use of a Cramer's V statistic, but none was reported in the findings section. Why?

Primary perceptions that teacher education departments have primary responsibility for coordinating and delivering teacher preparation programs are not surprising. An important implication not mentioned in the paper is that teacher education faculty should form and/or convene advisory councils made up of representatives of the groups studied in this research. Since these groups have a stake and varying roles in teacher education, they could be asked for assistance and advice concerning policy making for improved coordination, delivery, and funding of teacher education.

INTERNATIONAL DIMENSIONS OF AGRICULTURAL EDUCATION PROGRAMS THROUGHOUT THE UNITED STATES AND ITS TERRITORIES

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INTRODUCTION

A growing concern among agricultural educators reveals the need to view the profession from an international perspective (Welton & Harbstreit, 1990, Bristol, 1975, Nelson,1987). It is becoming evident that most U.S. students lack the international understanding which will enable them to participate more fully in an interdependent world (Rosengren, Wiley & Wiley, 1983). One of the major challenges to agricultural education is addressing the issue of a growing international interdependence in the area of agriculture. It has become clear that for a student to be considered educated in agriculture, he or she must be aware of the inter-relationships of various agricultural systems and the governments, cultures and societies in which they function (Martin & Keller, 1989). In order to achieve this objective, our teachers must be prepared to teach their subjects with an international perspective. Unfortunately, education majors in U.S. colleges and universities, including those in agricultural education, are among those most unprepared to meet the challenge of implementing a global perspective in their future careers (Kobus, 1983).

In 1983, Welton and Thuemmel conducted a national assessment of international activities in agricultural education. A number of initiatives have been established to encourage international activities in agricultural education. including those recommended the National Research Council (1988). This study was needed to determine what national progress has been made in the area of international agricultural education.

PURPOSE AND OBJECTIVES

The primary purpose of this study was to describe the extent of international agricultural teacher education activities in agricultural education departments located in institutions of higher education throughout the United States and its territories. A secondary purpose was to determine what relationships existed between the extent of international activities with selected demographic variables. The study attempted answered the following research questions:

1. What was the extent of departmental involvement and interest in undergraduate international agricultural education?

2. To what extent were administrative structures in agricultural education departments supporting the international dimensions of the undergraduate teacher education program?

3. To what extent was the undergraduate agricultural teacher education curriculum providing an international perspective as a fundamental part of the general and professional studies in agricultural teacher education programs?

4. To what extent were departments of agricultural teacher education recruiting and supporting faculty whose teaching, research, and service are oriented toward the international dimensions of the program?

5. To what extent were departments of agricultural education encouraging undergraduate awareness of the international dimensions of agricultural education?

6. To what extent were agricultural teacher education departments providing personnel, materials, curricular, and organizational resources to support the infusion of an international dimension into their undergraduate programs?

7. To what extent were agricultural teacher education departments committed to providing service to secondary vocational agricultural programs, community college agriculture programs and agribusiness in the area of international education?

8. To what extent were agricultural teacher education departments encouraging their faculty to pursue an international dimension to their research function?.

9. What was the extent of departmental involvement and interest in graduate international agricultural education?

10. What relationships existed between departmental involvement with undergraduate international agricultural education and selected demographic variables?.

PROCEDURES

RESEARCH DESIGN

This study was descriptive with a correlational component. The study utilized descriptive research methodology because of its ability to contribute valuable information about the present status of current programs (Borg & Gall, 1989).

POPULATION

The study population included all of the agricultural teacher education departments found in universities and colleges throughout the United States. According to the 1990-91 Directory of Teacher Educators in Agriculture (Whaley, 1990), this population included 96 agricultural teacher education departments. Questionnaires were distributed to the entire population. No sampling was performed.

INSTRUMENTATION

The instrument utilized in this study was adapted from questions developed by the American Association of Colleges for Teacher Education (1986) and later revised by Welton (1987) for agricultural teacher educators. The instrument was divided into two sections. Section I asked respondents to provide demographic information about the institution and department that they represented. In Section II, respondents were asked to indicate the degree of departmental involvement in international activities, the approximate percent of departmental time devoted to international agricultural education and the degree to which their department desired involvement with international agricultural education. Additionally, respondents were asked to describe how their department supported each of the international dimensions by submitting course descriptions, mission statements, budgets etc..

Content validity was established by a panel of faculty with international agricultural education experience who reviewed the instrument for inclusiveness, clarity, and readability. Based upon their recommendations, revisions to the instrument were made. Reliability estimates were not appropriate since the items were not scaled.

DATA COLLECTION

Data were collected through the use of a mailed questionnaire. Questionnaires were completed by only one member of each department/program of agricultural teacher education. Follow-up procedures included a second mailing to late respondents and finally a telephone call as a third round procedure urging participation. Responses were received from 89% (85 of 96) of the agricultural teacher education departments. Late respondents were compared with early respondents to determine if they differed in their response to each question (Miller and Smith, 1983). No significant differences were found.

ANALYSIS OF DATA

All data were analyzed utilizing SPSS on an IBM 3161 computer. Data were reported as frequencies, percentages, and measures of central tendency to describe the extent of international activities. Rank-biserial correlation coefficients and crosstab comparisons generating Cramer's V were used to determine if relationships existed between the dependent variable of international involvement and selected demographic variables. Davis conventions were used to interpret the strength of the relationship.

RESULTS

The majority of the departments of agricultural education (55.7%) were in 1862 land grant institutions with a total student body population of 20,000 A total of 356 faculty, ranging from 1 to 31, worked in 79 departments. Forty-five female faculty members represented only 12.6% of the total agricultural education profession and 35 non-white faculty represented 10% of the profession. Thirty-nine percent of the departments reported having no faculty with short-term international experience while 54.4% had no faculty members with long-term international experience. The majority of the departments (65.8%) reported that they were located in the college of Agriculture and 21.5% located in the college of education.

Only 1.3% of the departments reported to be very involved in undergraduate international agricultural education while 32.8% were not at all involved. However, 11.4% of the departments indicated that they desired to be much more involved with international agricultural education.

Less than half of the departments (40.5%) reported that their official departmental mission statement included references to international education while only 32.9% of the departments reported that their administration specifically allocated financial resources to support international education activities. A total of 157 (44.1%) faculty members reported to have participated in professional associations that emphasize international education.

Relating to curriculum development, a mere 8.9% of the departments indicated that their faculty members were mandated to infuse international dimensions into their agricultural education courses and only 29.1% reported that their department offered at least one course specifically to international agricultural education. Just 12.7% of the departments required their students to improve their foreign language skills and 1.3% required their faculty to improve their foreign language ability.

The majority of the departments indicated support for faculty development. Over half, 58.2%, reported that since 1980, their faculty have strengthened their international awareness and expertise by seeking opportunities such as travel grants, Fulbright awards, and other international fellowships. An equal percentage, 58.2%, indicated that their faculty taught courses, and or participated in activities that emphasized the international dimensions of agricultural education. However, just 26.6% indicated that their department provided formal recognition and other incentives to faculty to become active in international education. A total of 169 faculty taught courses or participated in activities that emphasized international agricultural education, and 185 faculty were awarded travel grants, Fulbrights and other international fellowships since 1980.

As for the allocation of departmental resources that support international education, 47% of the departments acknowledged that their library and instructional material centers are adequately equipped to support the international dimensions of the agricultural education program. However, 75% reported that faculty and students have easy access to timely information about study and work abroad while 34% of the departments regularly designate individuals to coordinate, administer and promote international education at the undergraduate level.

A greater number of departments were involved in the service function of agricultural education. Just under half (48.1%) reported that in the past year, their members have shared their knowledge and experience in international education with on-and off campus groups while 26.6% actively promoted its service function/role to agricultural education programs, community college programs, and agribusiness in the area of international education.

Forty-three percent of the departments reported having faculty members who have published articles and research findings that have an international focus since 1980-81. However, only 32.9% indicated that their department strongly encouraged and provided support for faculty involved in international research. Respondents reported that 44.3% assigned faculty with international experience as research or dissertation advisors. A total of 104 faculty members were reported as having published articles that had an international focus and a total of 208 articles were published with an international focus.

A greater percentage (85.7%) of the departments with one or more female faculty members reported to be involved with undergraduate international agricultural education than with those departments (60.3%) reporting having no female faculty members. A moderate, positive relationship between international involvement and number of female faculty (Rank-biserial = .31). Additionally, departments with one or more non-white faculty (85.7%) reported more involvement than those departments (60.3%) with no non-white faculty. A moderate, positive relationship between international involvement and number of non-white faculty existed (Rank-biserial = .37).

A greater percentage of departments with one or more faculty with short-term international experience (83.3%) reported involvement with international agricultural education at the undergraduate level while only 41.9% of departments with no faculty with short-term international experience were involved. A moderate relationship existed between faculty with short term experience and departmental involvement (r_{rb} = .42). Additionally, 86.1% of departments with one or more faculty with long-term international experience indicated involvement with international activities (r_{rb} = .46).

Departments (81%) with one or more faculty members with any international experience were more involved with undergraduate international agricultural education than those without any faculty with international experience of any duration. However, a small percentage of departments without any internationally experienced faculty (28.6%) reported some involvement with international agricultural education.

CONCLUSIONS

The following conclusions were drawn from the study:

1. Departments of agricultural education are attempting to involve

themselves with international activities as at least 67% have committed to some level of involvement.

2. Departmental administrative leadership is not very supportive of international agricultural education initiatives at the undergraduate level. Faculty participation is supported primarily through individual efforts.

3. Agricultural education departments do not regard experience abroad or an interest in international issues as a criterion for faculty recognition and recruitment.

4. Agricultural education departments provide little support for faculty involved in research that has an international focus.

5. Agricultural education undergraduates have few opportunities to major in international agricultural education across the country.

6. Most departmental resources, such as library holdings and instructional materials, are adequate to support the international dimensions of agricultural education at the undergraduate level.

7. A majority of agricultural education departments do not adequately promote their service function/role in the area of international education.

8. Faculty are independently pursuing international activities and using grants Fulbrights, and other international awards to strengthen their international expertise.

9. Departmental involvement with international agricultural education is greater, though still low, at the graduate level since 8.9% of the departments indicated they were very involved with international agricultural education at the graduate level as compared to 1.3% at the undergraduate level.

10. Increasing the opportunities for international experience abroad could increase the level of departmental involvement with international education since a moderate relationship exists between the extent of departmental undergraduate involvement with international agricultural education and those departments with faculty who have professional international experience abroad.

RECOMMENDATIONS

Specific reference to international education should be included within the official departmental mission statement, if incorporating the international dimension is important to the profession. Departments should designate an individual to coordinate, administer and promote international education, and to insure that faculty and students have access to current information. Departments should encourage faculty to expand their service role by participating in international agricultural development projects and by sharing their international knowledge and experience with on-and off campus groups.

Departments should encourage and recognize faculty who engage in research that has an international focus. Further research should be conducted to assess the importance of international agricultural education activities and the effectiveness of innovative infusion programs which encourage international education.

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INTERNATIONAL DIMENSIONS OF AGRICULTURAL EDUCATION PROGRAMS THROUGHOUT THE UNITED STATES AND ITS TERRITORIES

A Critique

Stacy A. Gartin, West Virginia University--Discussant

Agricultural educators support the National Research Council's recommendation of needing to view the profession from an international perspective. I would like commend the researchers for selecting the very timely topic of determining what national progress has been made in the area of international agricultural education.

The purpose and objectives of the study, which were in the form of research questions, gave direction for the study. However, it would have provided clarity to the reader if the selected demographic variables would have been identified in the research questions.

The following are a few observations and suggestions the authors may wish to consider as they continue their research.

- How can the national progress of international agriculture be determined if it isn't compared to the finding of Welton and Thuemmel of 1983?

- Where were the other 12.7% of the ag ed departments located if they weren't in the College of Ag or Ed?

- Does the finding of 157 faculty members having participated in associations with an international emphasis include only those filling out the questionnaire or all faculty members in those departments responding?

- What was the rationale for changing the correlational coefficients from Cramer's V=.26 for both the relationship between international involvement and female and non-white faculty in your proposal (which were low relationships) to Rank-biserial, r rb=.31 and .37 respectively, in your final paper.

- I would caution the researchers in drawing some of the conclusions they did based on the findings which they reported.

- What was the basis for recommending that faculty should be recognized for engaging in research with an international focus, as opposed to faculty who conduct research in other areas of importance to the profession?

I commend the researchers for exploring an important area of concern. I feel that with clarity in presenting the findings, conclusions and recommendations that the study will be useful in helping to encourage and promote development activities.

EFFECTIVENESS OF A STATE AGRICULTURE IN THE CLASSROOM PROGRAM

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INTRODUCTION

In recent years agricultural educators have stressed the need for a populace who are better informed about agriculture. According to the National Research Council (1988), approximately two percent of the nation's population live on a farm. This contrasts with 30% in 1920 and 15% in 1950. Most of today's elementary school children are at least two generations away from first hand knowledge of agriculture (Farm Bureau Federation, 1983). A Texas study of the needs teachers have for implementing programs of agricultural literacy revealed that almost all of the fourth grade teachers surveyed had an inaccurate perception of agriculture. Studies in Kansas (Horn and Vining, 1986) and Virginia (Oliver, 1985) indicated a lack of basic knowledge about agriculture among elementary school students. A conclusion of the National Research Council's study of agricultural education in the U. S. (1988) was: "Most Americans know very little about agriculture, its social and economic significance in the United States, and particularly, its link to human environmental quality". The study recommended that: "All students should receive at least some systematic instruction about agriculture beginning in kindergarten and first grade and continuing through twelfth grade".

The USDA recognized this problem when in 1981 it began a program called Agriculture in the Classroom, which was aimed at providing training and teaching materials for elementary teachers to incorporate agricultural concepts into their instruction. To date, 47 states have developed materials for use in the program. In the state of Georgia the program began in 1983 as a cooperative effort between the State Farm Bureau and the State Department of Education. The overall objective of the program was: "To teach children where food and fiber comes from and the importance of agriculture to the economy". As specific objectives were written, units of instruction for each unit were developed for the objectives. Curriculum for grades K through four was intended as a means to integrate agricultural concepts into the regular curriculum. The concept was that, as the basic skills were taught, agricultural examples could be used as illustrations. Representatives of education and agriculture developed and pilot tested the materials and prior to implementation, teachers received inservice training on how to use the material. The recommended time for teaching the curriculum was six weeks.

Since the curriculum was first taught in 1987 and had never been evaluated, project personnel decided that the effectiveness of the program should be examined. A search of the literature failed to identify any previous attempt to evaluate the Agriculture in the Classroom Program in any of the states.

PURPOSE AND OBJECTIVES

The overall purpose of the study was to determine whether the curriculum being taught in Georgia through the Agriculture in the Classroom Program was accomplishing the Program's objective of teaching elementary students about agriculture.
The specific objectives of the study were to determine:

1. The effectiveness of the state's Agriculture in the Classroom Program in teaching agricultural concepts to second and fourth grade students.
2. The influence school location (in a rural or city area) had on the effectiveness of teaching agricultural concepts.
3. The influence teacher experience in agriculture had on the effectiveness of teaching agricultural concepts.
4. The influence student ability grouping had on the effectiveness of teaching agricultural concepts.

PROCEDURES

The research was conducted using an experimental posttest-only control group design. According to Gay (1976), this design is superior to the pretest-posttest design when the treatment is of a relatively short nature and problems with mortality are not likely. Likewise, the Solomon Four Group Design is not considered to be superior unless mortality of subjects is anticipated. Fourteen schools were selected to participate in the study. Schools were chosen that would represent the different geographical areas of the state. Schools were also chosen from the major cities to represent urban areas and from rural areas to represent rural populations of students. A treatment group and a control group were used in each school. This gave a total of 28 classes (16 classes of second grade and 12 classes of fourth grades) that participated in the study. Control and treatment groups were paired in the same school. For instance, a fourth grade class whose teacher had received program training was used as a treatment group and was paired with a fourth grade class in that same school whose teacher received no training (the control group). Teachers were contacted by telephone to secure their agreement in assisting with the research. They were given instructions both by mail and by telephone on how to proceed with the research. The total number of participants was: 346 second graders (8 classes in the control group and 8 classes in the treatment group); 252 fourth graders (6 classes in the control group and 6 classes in the treatment group). One class in the fourth grade treatment group failed to complete the study, thus reducing the effective number of treatment groups to five.

The instruments consisted of a 20 item multiple choice test for the fourth grade and a 10 item multiple choice test for the second grade. The tests were developed by the researchers and reviewed by a panel of experts consisting of teacher educators, Ag-in-the-Classroom Project personnel, Agricultural Education graduate students, and second and fourth grade teachers. The panel was given the curriculum and the objectives of the project and asked to determine if the test items indicated whether or not students had obtained the concepts outlined by the objectives of the project and if the questions were appropriate for the grade levels. Suggestions from the panel were incorporated into the tests. The instruments were pilot tested using second and fourth grade students who were not a part of either the treatment group or the control group. After incorporating the suggestions gained from the first pilot test, the instrument was pilot tested a second time to ensure the understandability of the test. Reliability for the fourth grade test was moderately high at .76 for Cronbach's alpha. Reliability for the second grade test was somewhat low at .35 for Cronbach's alpha. The low reliability for the second grade test was probably due to the difficulty level of the exam and the small number of questions on the exam. Both the length of the exam and the difficulty level were designed to deal with the complications encountered in examining second graders with an exam that they could understand and at the same time be valid. Implications of that portion of the study concerning the second grade curriculum should be viewed in light of this measurement.

The curriculum was taught to all of the treatment groups during the same six week period. When the units were completed by the treatment groups, the teachers of both the treatment and control groups were given the exams to administer to their students. In order to help control for differences in reading ability, the teachers were asked to read each exam question to the class but not to make any further comment. The exams were returned to the researchers and the data were analyzed using the t-test.

ANALYSIS OF DATA

Objective one: Determine the effectiveness of the state Agriculture in the Classroom Program in teaching agricultural concepts to second and fourth grade students. The exams of all groups were scored and tested using the t-test. As indicated in Table 1, in both the second grade and the fourth grade, the treatment groups scored significantly higher on the exams ($p <$ .001 level for the second grade and $p <$ .001 level for the fourth grade group).

Insert Table 1 about here

Objective two: Determine the influence of school location(in a rural or city area) had on the effectiveness of teaching agricultural concepts. The scores of classes from the major cities in the state were tested (t-test) against the scores of classes from rural areas. In both the city and rural settings, the treatment groups scored significantly higher than did the control groups (Table 2).

Insert Table 2 about here

Significance levels were: second grade rural groups, $p < .001$; second grade city groups, $p < .001$; fourth grade rural groups, $p < .002$; and fourth grade city group, $p < .001$.

Objective three: Determine the influence teacher experience in agriculture had on the effectiveness of teaching agricultural concepts. On a brief questionnaire, the teachers were asked to indicate their level of experience with agriculture. As Table 3 indicates, no significant differences were detected between the control and treatment groups of second grade classes whose teachers indicated that they had been raised on a farm.

Insert Table 3 about here

Fourth grade control groups did not have teachers who were raised on a farm, so no comparisons could be made. High degrees of significance ($p < .001$ level for the second grade and $p < .001$ level for the fourth grade) were found between the control group and the treatment groups of classes whose teachers indicated they had little or no agricultural experience. In each instance the treatment group scored higher than the control group.

Objective four: Determine the influence student ability grouping had on the effectiveness of teaching agricultural concepts. Teachers were asked to indicate whether the students were assigned to their rooms based on ability or random assignment. When analyzed using the t-test, the data indicated significant differences in the scores of control and treatment groups for both second and fourth grades when compared in terms of assignment by ability and by random assignment (Table 4).

Insert Table 4 about here

Significance levels were $p < .001$ for the second grade randomly assigned group; $p < .001$ for the second grade ability assigned group; $p < .021$ for the randomly assigned fourth grade group; and $p < .001$ for the ability assigned group. In each case the treatment group outscored the control group.

CONCLUSIONS

1. The state Agriculture in the Classroom Program was effective in teaching agricultural concepts to elementary students.
2. The program was effective in both the rural and city settings.
3. The program did not appear to make a difference among classes whose teachers were raised on a farm; however, the data indicate that the program made a difference among students whose teachers had little or no farm experience.
4. The program was effective whether students were randomly assigned to classes or assigned according to ability.

RECOMMENDATIONS AND IMPLICATIONS

1. The state Agriculture in the Classroom Project should be continued.
2. Emphasis should be continued on educating teachers about agricultural concepts. The lack of significant differences between the control and treatment groups whose teachers were raised on a farm implies that the knowledge level of the teacher is an important factor in the teaching of agricultural concepts. This is further supported by the high level of significance in the difference between the scores of the treatment and control classes whose teachers had little or no experience in agriculture.
3. The research involving the second grade should be replicated using a revised instrument to address the relatively low reliability for that test.
4. Research should be continued on a longitudinal basis to determine the long range effectiveness of the curriculum. Although this research revealed that the curriculum made a difference, there is a need to determine the long term retention rate of the concepts after the students have reached high school and beyond.

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Table 1

t-Values For Scores of Control and Treatment Groups

	N	Mean	t-Value	Alpha
Second Grade				
Treatment	171	7.152	5.29	.000
Control	175	6.297		
Fourth Grade				
Treatment	120	14.642	6.50	.000
Control	132	11.727		

Table 2

t-Values of Control and Treatment Groups Compared by Setting

	N	Mean	t-Value	Alpha
Second Grade Rural				
Treatment	88	7.182	3.61	.000
Control	86	6.372		
Second Grade City				
Treatment	83	7.120	3.84	.000
Control	89	6.225		
Fourth Grade Rural				
Treatment	72	14.500	3.20	.002
Control	65	12.508		
Fourth Grade City				
Treatment	48	14.854	6.08	.000
Control	67	10.970		

Table 3

t-Values of Control and Treatment Groups Compared to Teacher Agricultural Experience

	N	Mean	t-Value	Alpha
Second Grade Raised on Farm				
Treatment	29	6.940	1.25	.214
Control	79	6.532		
Second Grade Little Experience				
Treatment	117	7.308	4.79	.000
Control	47	6.064		
Fourth Grade Raised on Farm				
Treatment	54	—	—	—
Control	0			
Fourth Grade Little Experience				
Treatment	66	12.742	3.36	.001
Control	42	10.452		

Table 4

t-Values of Control and Treatment Groups Compared by Class Assignment

	N	Mean	t-Value	Alpha
Second Grade Random				
Treatment	78	6.961	3.25	.001
Control	65	6.154		
Second Grade Ability				
Treatment	93	7.312	3.54	.001
Control	88	6.500		
Fourth Grade Random				
Treatment	66	12.742	2.33	.021
Control	100	11.450		
Fourth Grade Ability				
Treatment	54	16.963	7.34	.000
Control	32	12.594		

EFFECTIVENESS OF A STATE AGRICULTURE IN THE CLASSROOM PROGRAM

A Critique

Stacy A. Gartin, West Virginia University--Discussant

I would like to commend the investigators for studying such a timely topic as Ag in the Classroom in Georgia. As the profession attempts to address the findings of the National Study research is needed to ascertain the impact and effectiveness of such programs.

The researchers should be commended for establishing the theoretical frame which served as a basis for the study. The purpose and objectives of the study were clearly written. The research design was acceptable for this study.

The following are a few observations and suggestions the authors my wish to consider as they continue their research.

- It seems to this researcher that you were testing the "training program" which teachers received as opposed to the effectiveness of the Ag in the Classroom program.

- What was the rationale for selecting 2nd graders and 4th graders?

- It would have been helpful to the reader if you would have operationally defined "rural schools."

- What alpha level was set apriori?

- Students in the treatment groups did score higher than did students in the control group, but would have a pretest - posttest control group design given you an idea of what the students knew to start out with.

- Would have the students scored higher if groups would have had weekly exams rather than one comprehensive exam at the end of the six week unit. Did these teachers usually teach an entire unit before evaluating student learning.

- I found it rather unique that after a six week unit only ten questions were identified to exam the second graders' knowledge.
What did the researchers do to try to raise the reliability of the second grade exam?

In conclusion I find the paper well written and of value to the Agricultural Education profession. I commend the researchers for exploring an important area of concern about the Ag in the Classroom program in Georgia.

HEROES, VILLAINS, PRETTY GIRLS AND MODERN FARMING PRACTICES: THE CONTRIBUTIONS OF ADOLESCENT AGRICULTURAL NOVELS TO AGRICULTURAL EDUCATION, 1925-1940

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INTRODUCTION

During the last four decades, agricultural educators have expressed concern about the reading ability of their students. In 1954 Brunner and Koble found that school librarians and vocational agriculture teachers in Pennsylvania had difficulty getting vocational agriculture students interested in reading. Galloway's 1960 doctoral dissertation was on the reading level of agricultural students and their textbooks. During the 1970's Sherrell (1978) found vocational students in Missouri to read below the grade level they had obtained and also found that most texts were written one to seven grade levels above the ability of the students. Welch's 1981 dissertation looked at readability of horticultural materials. As recent as 1989 an article in The Agricultural Education Magazine examined factors to consider in selecting books for high school agricultural students (Moss and Moss, 1989).

The reading ability of students and their desire to read did not appear to be a concern of the agricultural education profession during the 1930's and 1940's. There is virtually no mention made of this problem in the agricultural education literature. Perhaps one of the reasons reading was not an identifiable concern during this era was because there was a number of novels written specifically for agriculture students. Agricultural educators of today might gain some ideas about improving the reading habits of agriculture students by examining the adolescent agricultural novels found in vocational agriculture between 1925 and 1940.

PURPOSE AND OBJECTIVES

1. To identify the "vocational agriculture" novels read by vocational agriculture students during the 1925-1940 era.

2. To analyze the contents of the "vocational agriculture" novels.

3. To determine the purpose and uses of the adolescent "vocational agriculture" novels.

PROCEDURES/ANALYSIS OF DATA

Standard historical research procedures were used in this study. First, all issues of The Agricultural Education Magazine published between 1925 and 1940 were examined to identify agricultural novels. During this era numerous news items were published in the Magazine, including announcements of new books. The researcher also searched the Farm Journal and Farmer's Wife and Successful Farming. Brief discussions of new books were regularly featured in these publication. Suggested lists of readings for vocational agriculture students published in The Agricultural Education Magazine (Brunner, 1954) and by the agricultural education faculty at North Carolina State starting in 1935 were examined. After identifying the agricultural education novels and their authors from these sources, the Union Serial Listing was consulted to determine if additional, but yet unidentified books, had been written by the same authors. After the researcher was satisfied that all the books had been identified, a personal search was conducted for the identified books in university, school, public and private libraries in Wisconsin, Colorado, Louisiana, Indiana, Texas, Georgia and North Carolina. Next, personal or phone interviews were held with individuals (generally retired agricultural educators) in Virginia, Georgia, Illinois, Washington (DC) and Louisiana to secure more information about the books and to determine how they were used. This was followed by a trip to the National Agricultural Library for additional research on the topic. This research was conducted over a seven year period. It should be noted that several novels concerned with youth activities in 4-H, scouting and home economics education were found but fell outside the scope of this research effort. Also there were at least three series of juvenile novels (The Boy Ranchers, the X Bar X Boys, and the Range and Grange Hustlers) that glorified farming and ranching but had no connection to vocational agriculture.

Copies of all but two of the books were obtained by the researcher and read. Detailed notes concerning each book were kept and a qualitative interpretation of each book was made by the researcher.

RESULTS

The Novels and Authors

Eight novels and one collection of short stories for vocational agriculture students were published between 1925 and 1940. Three authors were involved in writing the novels and one author was involved in collecting the short stories. A listing of the authors and their works is found in Table 1.

Table 1

Adolescent Vocational Agriculture Books, 1925-1940

Author	Title	Publication Date
John Case	Tom of Peace Valley	1925
	Moon Valley	1932
	Peace Valley Warrior	1937
Paul Chapman	The Greenhand	1932
A. W. Nolan	Short Stories for Future Farmers	1936
Sarah Lindsay Schmidt	New Land	1933
	Ranching on Eagle Eye	1936
	The Secret of Silver Peak	1938
	Shadow over Winding Ranch	1940

The Case Novels

John F. Case, editor of the Missouri Ruralist and President of the Missouri Board of Agriculture, wrote three "vocational agriculture" novels. The first, Tom of Peace Valley (subtitled Boy Knight of Agriculture) published in 1925 tells how the hero and main character of all three novels, Tom Woodson became involved in vocational agriculture. Tom, who was reared in an isolated backwoods valley where trapping and hunting were the main stays of existence and "eddication" was ridiculed, had the opportunity to go "outside" to the little town of Blanton 10 miles away for schooling. With moral support from his mother and financial support from an "outside" uncle, Tom went to Blanton, found a place to board, and enrolled in school. Tom's decision to go outside the valley for education was not warmly received by the populace in Peace Valley.

On the way to school the first morning, Tom came across a group of local boys beating up on the town drunk. He broke up the altercation but this action was the start of a lasting hostility between Tom and the local "in group" which was lead by "Bull" Durham, the only son of the town banker and school board president. It was only a matter of time before a fist fight was provoked by Bull. Bull received a thrashing in an honest and fair fight but told his father that Woodson and a gang of boys beat him up. Mr. Durham convened the school board and attempted to get Tom kicked out of school, but was not successful because the agriculture teacher, John Roberts had seen the fight and told what happened.

Because of his love for the outdoors, Tom had been enrolled in vocational agriculture which was a new program that year. Mr. Roberts was not only the agriculture teacher but a collegiate football star and Blanton High's football coach. He encouraged Tom to join the team. Even though Tom had never played the game he quickly caught on and was soon giving Bull Durham considerable competition on the playing field.

Tom found vocational agriculture to his liking and was soon planning a corn project and was enrolled in the state corn growing contest. Tom, with help from Mr. Roberts, rented a plot of land in Peace Valley for the project. Because of Tom's outstanding performance in a state corn judging contest, the top corn grower in the state gave Tom some seed corn. However, the plot thickened when a midnight thief stole Tom's seed corn. Tom enlisted the aid of his mountain kin (and dog) in following the trail of the thief and found where the seed corn had been hidden.

Soon Tom was preparing the ground and planting corn to the great amusement of the locals in Peace Valley. Everyone knew crops just didn't grow in Peace Valley, farming was hard work, and the time could be better spent fishing and hunting. Tom was soon studying the art of growing corn with great determination and applying what he learned in the vocational agriculture class; to the great derision of the locals in Peace Valley. However, after a while it became evident that Tom would have an exceptional corn yield and the hill folk started taking pride in Tom's field and even started protecting the field from varmits, both two legged and four legged.

The book concluded with Woodson and Durham grudgingly working together to carry Blanton High to a major football victory over arch rival Denman High.

This stirring victory united the town folk and the hill people. Tom made a profit of $700 on his corn crop, placed second in the state corn growing contest and won a prize of $250. The books ends with Bull Durham repenting of his treacherous ways and confessing to stealing the seed corn and trying to destroy Tom's corn field.

In the second Case novel (Moon Valley), Tom has graduated from the state agricultural college as a vocational agriculture teacher and has the hard job of convincing the adults and students in a new school district, Moon Valley, of the values of vocational agriculture. Tom is also the school principal and teaches adult farmer classes. In a suspenseful plot, the school is torched, bullets are fired, and a girl is wooed before Tom and vocational agriculture triumph. In the third novel (Peace Valley Warrior), Tom is elected to the state legislature.

Case also wrote a novel on the 4-H (Under the 4-H Flag, 1927) and one on Scouting (Banners of Scoutcraft, 1929).

The Chapman Novel

The most celebrated vocational agriculture novel was The Greenhand written by Paul Chapman in 1932. In this novel a backwoods rowdy, Fred Dale, after disrupting a Future Farmers of America Banquet and accidently shooting the vocational agriculture teacher during a deer hunt, is persuaded to enroll in vocational agriculture and join the FFA. Slowly he becomes involved in the FFA and public speaking. He gets the vocational agriculture students involved in a cooperative project growing tomatoes for a soup company, falls in love with the beautiful daughter of the soup company president, and wins the national FFA public speaking contest just in time to rescue the home farm on which he and his widow mother live from the clutches of the about-to-foreclose banker. His winning FFA speech is about the South and how modern agricultural practices can lead the South out of poverty. He also wins the heart of the girl.

The Greenhand was made into a 90 minute movie by the Sears Roebuck Foundation in 1939. In describing the movie, the Farm Journal and Farmer's Wife (Andersen, 1940, p. 43) describe it as "...a romance-coated plug for scientific agriculture and better farming in the South." The setting for the movie and the novel was Georgia. The actors were all amateurs and included state and federal vocational agricultural officials.

Chapman was Dean of Agriculture at the University of Georgia and wrote numerous technical books. This was his only novel.

The Schmidt Novels

Sarah Lindsay Schmidt wrote at least four books about vocational agriculture students. Even though each book is different there are similarities in all the books. The setting for each book is in the West (Colorado or Wyoming). In each story there is typically a nary-do-well father with a motherless family composed of one or two boys (one still in school and one out) and a strong sister, and a malevolent school age adversary whose father is typically the prominent citizen in the community. In each novel there is conflict, suspicions of dirty dealings, a neighboring girl to be wooed, and a foreboding mortgage. In each novel, the application of modern agriculture practices saves the day (irrigation of alfalfa, marketing livestock cooperatively, developing a hybrid corn). There is also a strong, patriotic dose of the Future Farmers of America in each book. One student even became the Star Farmer of America (David in Shadow over Winding Ranch).

It is interesting to note the Ms. Schmidt's husband was G. A. Schmidt, the agricultural teacher educator at Colorado State. She also wrote a book in 1943 titled The Hurricane Mystery, or which this writer has no knowledge. Her memoirs, This is my Heritage, were published in 1953 by Aberlard Press in New York.

Nolan's Collection of Short Stories

One other book should be mentioned. In 1936 A. W. Nolan, agricultural teacher educator at the University of Illinois, compiled a collection of 16 short stories for Future Farmers. This book titled Short Stories for Future Farmers was published by Interstate. The stories are mixture of action packed adventures emphasizing the outdoor life.

OTHER PUBLICATIONS OF INTEREST

During the course of this research, the investigator discovered other sources of literature that were popular with vocational agriculture students. A number of the farming magazines carried fiction pieces and special columns for young people. For example, Farm Journal and Farmer's Wife often carried a column during the 1940's titled "Young America" or "Young Farmers" or "Farm Journal Boys" (yes, there was a "Farm Journal Girls" column that featured recipes and answered letters from girls). At times there were short pieces designed to appeal to teen-age boys such as how to hunt for crows, how to throw a curve ball, how to go camping, and how to take good pictures. It was common to have a mini-novel that was full of adventure carrying over from issue to issue.

One magazine that was specially designed for the vocational agriculture student was a publication called The American Farm Youth. This publication was started in 1935 by Homer Paul Anderson of Utah and carried of variety of features designed to appeal to the rural youth. The minutes of the national FFA Board of Trustees Meeting from October 18-25, 1935 indicate that the following resolution was drafted:

> Encourage the efforts of Homer Paul Anderson, editor of "The American Farm Youth Magazine" and suggesting further cooperation and support from the F.F.A.

At this meeting there was some discussion of possibly turning this publication into an official national FFA magazine but the leaders thought it would not be wise at this time.

The American Farm Youth publication was discussed again in 1936 but with an entirely different view. The minutes of the F.F.A. National Board of Trustees from April show over a page of discussion concerning the magazine. The trustees were upset over the use of the FFA emblem on the front cover, the statement that this was "The only national publication for F.F.A. chapters," the advertisement for sale of stuffed owls, and advertisements for the "Chapter Supply Company." Chapman agreed to cooperate with the board more on matters related to policy.

Chapman sold the publication to a group in Danville, Illinois (Russ Guin was a minority owner) where it continued to be published until the 1950's. Interstate printed the publication but was not involved in the actual operations of the magazine. A copy of the magazine is on display at the National FFA Center.

CONCLUSIONS AND/OR RECOMMENDATIONS

The avowed purpose for most of the novels was to provide worthwhile leisure time reading for rural students because "... there has been a dearth of good books, available for farm boys and girls." (Nolan, 1936, i). However, the novels were also used to promote agriculture and vocational agriculture. During the period in which most of these books were written, American was in a depression and there was a mass exodus from the farm. These novels showed the success one could achieve by applying modern farming practices and becoming involved with the Future Farmers of America. One book (New Land) showed how out-of-school youth could benefit from the part-time program of vocational agriculture. It was clear from reading the books, that in spite of the depression, mistrust of scientific agriculture by some of the elders, and adversity (generally, the town bully), vocational agriculture held the promise for a better rural life. And you could also win the heart of the girl.

The reading of these novels was strictly voluntary in most cases. Many agricultural departments had copies of these books and would loan them to the students. A series of "Suggestive Helps to Teachers of Vocational Agriculture" was started in 1935 by the agricultural education staff at North Carolina State. The first publication was a "General Reference List for Teachers of Agriculture." This publication recommended Tom of Peace Valley, Moon Valley, The Greenhand, and New Land to the vocational agriculture teachers. A 1937 update of the list included Ranching on Eagle Eye. Brunner and Koble (1954) compiled a list of recommended fiction for Future Farmers. Most of their recommendations were general outdoor action books by authors such as Zane Grey, Jack London, and Rudyard Kipling. However, they do list the Case novels.

It should be remembered that during this era in America, 92% of the rural residents had limited access to libraries (Streeter, 1940) but eagerly sought books. Rural electrification was yet to come in many areas and television was non-existent. After the sun went down in rural areas, you either read, listed to a battery operated radio or visited the neighbors on weekends. People were constantly searching for good reading material.

In a few instances, reading these novels was not voluntary. In some areas of Louisiana, The Greenhand had to be read in order to get the Greenhand degree and Tom of Peace Valley had to be read to get the Chapter Farmer degree (Curtis, 1984).

One additional purpose of this literature was to develop character. According to Nolan (1936, i), "They should be definitely contributive to character education, since justice and right are consistently exalted, and punitive nemesis properly dealt out. Good will, good deeds and noble personalities are exemplified..."

Agricultural education novels were an important addition to vocational agriculture during the 1925-1940 era. They provided worthwhile leisure reading for students but also contained moral lessons and promoted modern farming practices. The underlying theme in each novel was that good triumphs over evil. It was also apparent that vocational agriculture, modern farming practices, and the Future Farmers of America were the keys to success.

The use of similar novels in agricultural education might be of value today in getting students to read more. Samuels (1989) found that students like "problem novels" and teen protagonists. Johns and Davis (1990) indicate students can be better readers if teachers suggest books that match student interests and make a great number of books available to students. This was happening in vocational agriculture in the 1925-1940 era. Perhaps it should be happening today?

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HEROES, VILLAINS, PRETTY GIRLS AND MODERN FARMING PRACTICES: THE CONTRIBUTIONS OF ADOLESCENT AGRICULTURAL NOVELS TO AGRICULTURAL EDUCATION, 1925-40

A Critique

Stacy A. Gartin, West Virginia University--Discussant

The researcher is correct in stating that the reading ability of agricultural students and their desire to read continues to be a major concern to agricultural educators at all levels. It is important that agricultural education researchers of today take more time to study our history in order to provide some insight about existing problems and concerns.

The author is to be commended for dedicating seven years to identifying, locating and reading the novels related to vocational agriculture between 1925 and 1940. The purpose and objectives of the study were clearly written and the procedures for gathering the data were appropriate for historical research. The researcher did an adequate job of addressing external and internal criticism of the documents.

The researcher is to be commended for his ability to synthesize the novels and for his brief overview of each. The overlying theme in each novel was that good triumphs over evil. The author suggests that similar novels in agricultural education might be of value today in getting students to read more.

The following are a few thoughts and questions which come to mind as related to these novels.

- What was the reading level of each novel?
- Would agricultural students of today read these novels (willingly or by requirement)?
- Are there any current agricultural novels on the market today and how do teachers locate them for their students?

In conclusion I find the paper well written (with the exception of three typos) and of value to the agricultural education profession. I hope that the researcher will continue his historical research as we try to learn from our past.

DIFFERENCES ON COMPUTING ANXIETY, EFFICACY AND UTILITY PERCEIVED BY FRESHMAN: A CROSS COLLEGE COMPARISON

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INTRODUCTION AND THEORETICAL FRAMEWORK

This study examines three theoretical constructs/concepts: computing anxiety, computing efficacy and computing utility as perceived by a random sample of freshmen in a large university. Comparisons by students' college and major examine differences between College of Agricultural and Life Science students and their peers in other units. This study is an important step in investigating student computing practices with respect to learning and perceived career applications. As this line of research continues, patterns of student use should emerge as a basis for constructing heuristics and paradigms. The inquiry has relevancy across the university to courses on educational computing, those that use educational computing and to courses in which computing is taught. In addition, the information is important to administrators and staff who provide computing support services and workshops in the university.

The construct, computing anxiety, draws from state/trait anxiety theory (Spielberger, 1983) which suggests that individuals possess a general anxiety "trait", and that when confronted with particular situations or circumstance they exhibit "state" anxiety. Studies of computing anxiety at the college level are typically limited to students in a single course. For example, Lambert and Lenthall (1989) examined computer anxiety among college students in a psychology course finding that state anxiety can be reduced through practice—although a small percentage of students are likely phobic or have high ambient anxiety levels. Meier (1985) takes a more conceptual approach, categorizing computer anxiety in a social learning perspective which consists of three components: fear, apprehension and opposition. This study expands on previous university research concerning computing in the social learning context.

A second variable, computing efficacy, is typically construed as a measure of learning effectiveness, comparing computer aided instruction with a traditional method (Skinner, 1988; Kearsley, 1977 and Stein, 1983). Arndt, Clevenger and Meiskey (1985) take another approach. These researchers investigated the efficacy of computing classes and found them rated high among students in a mid-western university. Students' computing efficacy toward their career choice receives limited attention in the literature. This variable is of interest to professional schools, such as Colleges of Agriculture and Life science, which prepares students for careers. It has some value to colleges of Arts and Sciences, although the focus in this setting is on an educated person irrespective of preparation for a profession.

The third variable, utility, refers to a current state of computing usefulness. Skinner (1988) found that computer-assisted instruction is prevalent in a wide variety of college courses. While the extensive use of computer applications, such as word processing and spreadsheets among college students is widely known, characterizations of utility are not adequately described.

In general, perception and attitudinal studies show promise of revealing important understanding of student computing (Skinner, 1988) and show that students' use of computing is related to positive attitude formation on their use (Kamm, 1981 and Schultz, 1985). This inquiry continues this line of research, contributing to the literature. It provides new knowledge concerning college of agriculture and life science students' attitudes and practices in comparison with their peers.

PURPOSE AND OBJECTIVES

The purpose of this study was to learn more about three phenomena (computing anxiety, efficacy and utility) in the social learning context in order to plan appropriate instructional interventions and to begin to construct a theory of a "new mental universe" that includes computing as an extension of mind and the social/work universe. The specific objectives were:

1. Describe selected demographic characteristics and computing practices of freshman students .

2. Determine differences by type of college in which students were enrolled with the regard to computing anxiety, efficacy and utility .

3. Determine differences by type of major in which students were enrolled with the regard to computing anxiety, efficacy and utility .

PROCEDURES

DESIGN

This research paper is a one-shot case study which will be replicated with the freshman class when they are seniors. The longitudinal component of the inquiry will lead into a time series design.

SAMPLE

The population was the freshman class (N=2882) at Cornell University. The accessible sample included students enrolled in a required Freshman Writing Seminar that had 170 sections. Forty-one sections were randomly drawn. Class rosters were verified with the University registrar's office and with each seminar section instructor to guard against frame error. Each section ranged from 5 to 17 students for a total of 571 individuals. Students were not required to complete the questionnaire. Of the accessible sample 504 students completed questionnaires for a response rate of 88%.

INSTRUMENTATION

The researcher developed an instrument to collect personal and demographic data and attitudinal responses on a bipolar type scale to selected statements. The instrument was pretested with college students and refined annually for three years prior to this study. Factor analysis was useful in developing three subscales for the research constructs. A panel of experts determined content and construct validity. As part of development and validity check, Cornell University Institute for Social Science Research provided assistance. The University Human Subjects Committee approved the questionnaire and research procedures. A subgroup of freshmen not included in this study completed the survey to establish instrument reliability. Cronback Alpha reliability coefficients were .70, .85 and .62 for the subscales career efficacy, anxiety and utility, respectively.

DATA COLLECTION

Instructors in 41 randomly selected freshman seminar sections were mailed a letter which explained the study. A research assistant then called each instructor to clarify questions and to obtain agreement to administer the instrument in their class sections. All instructors who were contacted agreed to participate. The instructors were mailed a packet which included instructions for administering the questionnaire, a statement to read during instrument administration and a sufficient number of questionnaires for all their students. Student participation was voluntary and unrelated to their grade in the course. Instruments were precoded to account for respondents, while maintaining respondent anonymity. A total of 504 instruments were received, beyond the number required for the size population.

DATA ANALYSIS

Descriptive and inferential statistics were used to analyze the data using SPSSX and mainframe computing. ANOVA and post hoc analysis were used to determine group differences. An Alpha level of .05 was established prior to the test for significant differences.

RESULTS/FINDINGS

DEMOGRAPHICS

By sex, 55% were male and 45% female, relatively compatible with the freshmen student population. The majority were White Caucasian (77.4%) followed by African American (4%) and the remainder were of various ethnic origins. Gender differences with respect to the independent variables investigated in this study were not observed at .05 Alpha.

With respect to general computing practices, the most frequent level of students' weekly use of microcomputers was 3-4 hours (31%), followed by 24% whose use was 5-6 hours and 15% at the 1-2 hour level. Only 6% reported 0 hours of use. One-third of the freshmen students come in contact with computer courseware in their classes during an average week. The most frequently occurring weekly level of courseware contact is one to two hours which was reported by 13% of all students in the study.

DIFFERENCES BY COLLEGE TYPE

Differences on the independent variables computing anxiety, efficacy and utility were determined for five college types: Agriculture and Life Sciences, Arts & Sciences, Human Ecology, Engineering, and Architecture and Industrial and Labor Relations (ILR). Students responded to a five point scale 1=strongly disagree to 5=strongly agree to statements pertaining to each variable.

For career efficacy, ANOVA statistics were significant ($p<.0001$). Post hoc analysis revealed Engineering student perceptions of career efficacy were significantly higher than those in Agriculture, Human Ecology, ILR and Art and Sciences. Similarly, anxiety levels were significantly higher ($p<.0001$) for Engineering students compared with Human Ecology, Agriculture and Arts and Sciences. Significance at .05 Alpha between colleges was not found for utility.

Students in all colleges agreed that computing had efficacy to their career ($\underline{x}=3.7$ to 4.5) and utility to their academic program ($\underline{x}=3.7$-4.0). However, they were neutral on the variable anxiety ($\underline{x}=2.8$ to 3.1), except Engineering students who self-rated themselves as having computing anxiety ($\underline{x}=3.6$).

DIFFERENCES BY MAJOR

The independent variables were analyzed for differences by academic major: Social Science, Humanities, Physical Science, Biological Science and Fine Arts. Students were assigned to one of five majors by recoding reading student's written responses to an open-ended question which asked for their major. Over 60 majors were initially listed by students. Previous field tests found that student could not accurately self-code their own major in one of the five. Recoding led to a more meaningful analysis and interpretation than would have been possible with wide range of majors, many of which had low cell counts.

For career efficacy and anxiety, ANOVA statistics were significant ($p<.0001$). Post hoc analysis revealed Physical Science students significantly higher than all majors except Fine Arts ($p>.05$) for both variables. Significance was not found by major for utility at the .05 alpha level.

All types of majors agreed that computing had efficacy to their career ($\underline{x}=3.7$ to 4.3) and utility ($\underline{x}=3.7$-4.0). However, they were neutral on the variable anxiety ($\underline{x}=2.9$ to 3.1) with the exception of Physical Science students who self-rated themselves ($\underline{x}=3.5$) as having computing anxiety .

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendation were derived from the findings.

1. Based on students' use of computers and their perceptions of its utility and efficacy for careers, College students need computing competence during the freshman year. Freshman students across colleges are using computers in their academic programs, typically, three to six hours a week.

2. Gender difference for the three independent variables in this study were not observed. Cell counts for ethnic origin were too low for a statistical comparison. The latter point point to a need to increase minority representation in the student body.

3. College faculty and university students need to understand the concepts and principles of computer assisted instruction. One-third of the college students use computer-assisted instruction in a typical week, suggesting the college faculty are adopting courseware in their classes.

4. All freshman students in this study perceive computing efficacy with respect to their career, suggesting that computing competence is important in their professional preparation. The nature of computing competency development in college deserves further study. In addition, the continuum of computing instruction between high school and college isn't clear. Access to instruction and to hardware and software in high schools deserves further inquiry.

5. Students in Engineering Colleges and Physical Science and Fine Arts Majors perceive a high level of efficacy, significantly greater than their peers in other colleges and majors. As a group, they also experience a higher level of anxiety than their college counter parts. Colleges in which these students reside should investigate why this phenomena exists among their freshman and if it persists throughout their the college program. One possible explanation is that this cohort of students typically enroll in a computer course during freshman year and are challenged by rigorous instruction that increases there computing anxieties.

6. Freshmen students in the College of Agriculture and Life Science included in this study perceive that computing has utility for their college academic program and their career. Students in the college have no more anxiety than their peers in other colleges and are less anxious than students from Engineering. Students in Colleges of Agriculture and Life Sciences should be monitored during others years of their academic study to determine if changes occur in computing efficacy, utility and anxiety.

7. Freshman students who experience computing anxiety should seek strategies to overcome this problem and the university should offer assistance. Instructors should take into consideration the ambient anxiety of some students in computing courses and introductory workshops . Although freshman students in this study, as a group neither agree nor disagree that anxiety about computing is part of their state of consciousness, some students have high ambient anxiety levels. The phenomena of computing anxiety needs further research. Is it a phenomena similar to test anxiety, a lack of skill or are their other explanations?

8. Computing is part of the mental universe for freshmen students. However, additional research is needed to further explore the dimensions of computing anxiety, utility and efficacy. Among the intriguing questions are how does computing assist students learning how to learn and solve problems. As the quantity of knowledge increases exponentially, what are the appropriate paradigms to structure repositories of knowledge/information? To what extent does

computing empower students and faculty? And, in what ways are they empowered?

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DIFFERENCES IN COMPUTING ANXIETY, EFFICACY, AND UTILITY PERCEIVED BY FRESHMAN: A CROSS COLLEGE COMPARISON

A Critique

Max B. McGhee, University of Florida -- Discussant

This university-wide study of computer anxiety, efficacy, and utility is the first step in a longitudinal study that should provide interesting data to determine trends. The use of computer technology has grown significantly in the last ten years and this study confirms that the technology is used 3-6 hours/week by almost half of the students. It will be interesting to hear the results of the follow-up study of these Cornell freshmen when they are seniors. Knowing the pace with which students pursue their programs of study, this follow-up is liable to take place from 4-10 years!

The researcher is commended for developing a very good conceptual framework for the study. In addition, the process for developing the instrument was well executed and the reliability/validity checks were all made. I'm sure the researcher would agree that it would have been better to have the reliability coefficients be higher, particularly for utility and efficacy. The percentage of completed questionnaires (88%) was very good. Was any follow-up of the non-respondents carried out?

Relative to the findings of this study, I found it interesting that Engineering students indicated a higher degree of anxiety than did other students. I would have expected them to have had more experience prior to their entrance into college, especially with computers used so widely in the engineering professions. Likewise, all students indicated that they felt that computers had high utility and I would have expected the engineers to indicate significantly higher utility. Sutphin's recommendation that further inquiry needs to be done relative to "the continuum of computing instruction between high school and college" is appropriate.

Suggestions for improvement for this study would include the previously mentioned desire for higher reliability coefficients and follow-up of non-respondents. In addition, I would suggest that the researcher (or his word processor) become more familiar with the spell check feature and proofread the reference list more completely. For future studies of this nature, I would like to see data collected about the previous computer experience of the respondents which might help to explain variations in computer anxiety, efficacy and utility among and between the various groupings.

In summary, this was an interesting study that provides some good baseline data for future investigations and theory building.

FACTORS PREVENTING MICROCOMPUTER USE AMONG SECONDARY AGRICULTURE EDUCATION TEACHERS IN THE UNITED STATES

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INTRODUCTION

In 1983, the editors of Time deviated from their normal routine of designating a man of the year by recognizing the computer as having the greatest impact on the world. The publishers wrote "Several human candidates might have represented 1982, but none symbolized the past year more richly, or will be viewed by history as more significant, than a machine: the computer" (Meyers, 1983).

Nowhere has the impact of the microcomputer been felt more strongly than in the schools of the United States. Bork (1985) declared that computer use in education is a highly dynamic technology and over the next 25 years will become the dominant delivery system in education. The Office of Educational Research and Improvement (1986), in the U. S. Department of Education, reported that 99% of all public high schools in the United States have purchased microcomputers. Data from the Second National Survey of Instructional Uses of School Computers indicates that the use of computers appears to be more common in vocational areas than in academic subjects (Survey Maps, 1986).

Sutphin (1985) stated that failure to include and use new technologies in the curriculum may jeopardize the credibility of the local agricultural education program and/or place the teacher at a disadvantage in terms of teaching effectiveness. Bowen, Miller, and Escolme (1989), Miller and Foster (1985) and Raven and Welton (1989) all wrote of the need for agricultural educators to utilize computers and urged training for those in the profession.

Several recent studies (Cantrell, 1982, Birkenholtz, Stewart, & Craven, 1989; Cepica, 1984) have documented a rapid increase in the use of microcomputers in agricultural education. According to Raven and Welton (1989), microcomputers are now an intrinsic part of agricultural education. Drueckhammer, Kotrlik, & Parton (1986) discovered that a large majority of agricultural education teachers in Louisiana who had computers failed to use them to a great extent. While a lack of training may be one reason why agricultural eduction teachers fail to extensively utilize computers, another reason may well be computer anxiety, or fear of computers. Gephart (1982) listed three factors that might prevent teachers from using computers: (a) fear of the unknown; (b) fear of obsolescence, or social problems; and (c) math anxiety.

No current national information exist as to the computer anxiety level of agricultural education teachers. Although several researchers (Bowen, 1984; Malpiedi, 1989; Miller and Foster,1985; Zidon and Luft,1987) have studied computer use or identified computer competencies needed by teachers on a statewide basis, few studies were found having national scope.

PURPOSE AND OBJECTIVES

The primary purpose of this study was to determine the computer anxiety level of secondary agricultural education teachers in the United States.

Specific objectives of the study were: (1) To determine the degree of computer anxiety that exists among these teachers in the United States and (2) To examine the proportion of the variance in computer anxiety level of these teachers explained by selected demographic variables associated with the teachers and local programs and (3) to determine other factors that prohibited computer use in agriculture classrooms.

METHODOLOGY

The population for this study included all secondary agricultural education teachers employed in public secondary schools in the United States during the 1989-1990 school year. The list of individuals in the target population was developed from the Agriculture Teachers Directory (Henry, 1989). Cochran's sample size formula (Cochran, 1977) and Dillman's (1978) suggested response rates were used to determine the sample of 224 teachers used in the study. The sample was selected using a systematic sampling technique with a random entry point.

Data collection was initiated in May 1990 and concluded in July 1990. The instrument for the study consisted of two parts. Part 1 collected information from the secondary agricultural education teachers regarding time spent by the teacher using the computer, demographic variables, and other variables related to the local agricultural education program. Part 1 of the instrument was an adapted version of one used by Smith and Kotrlik's (1988) in their study of Southern Region Cooperative Extension agents. A Cronbach's internal consistency reliability of .90 was obtained. Part II of the instrument consisted of Oetting's Computer Anxiety Scale (COMPAS) which measures level of computer anxiety. Oetting (1983) reported that the reliability for COMPAS was .96.

Procedures recommended by Dillman (1978) were used to collect the data for the study. A cover letter, questionnaire and self-addressed stamped envelope were mailed to each of the teachers selected. A follow-up card was sent after the first wave response was received. A second instrument mailout was completed along with a second follow-up post card. The non-respondents were contacted by telephone. Individual state departments of education were contacted to verify that the agriculture departments were still open and that teachers in the sample were teaching in the department or teaching in another department or were retired. After contacting the non-respondents by telephone, a hand written letter, survey instrument and a return self-addressed, stamped envelope was mailed for their response. Borg and Gall (1983) identified an acceptable response rate as being 80% return. Data presentation is based on 176 surveys for a useable return rate of 81.9%.

Data analysis included descriptive statistics, correlations, and stepwise multiple regression. An a piori level of .05 was used in establishing significance level.

FINDINGS

The age range given by 54.5% of the respondents was 36 and above. The most common age range was between 31 and 35. The highest degree held by 49.1% of the respondents was a masters degree. While 45.7% of the respondents held a bachelors degree as their highest degree. The remainder of the respondents (5.2%) held either an educational specialist or doctoral degree. Males made up 90% of the respondents. The average agricultural educator had taught for approximately 13.1 years. The responses ranged from 1 to 40 years of teaching experience.

The respondents perceived themselves to be novice computer users with minimal typing skills. The average agricultural education department enrollment was reported as 84.4 students. The agricultural educators reported using the computer an average of 1 to 3 hours per week. The typical agriculture educator (36.4%) reported having an average math ability, while 39.2% reported having an above average math ability. On the average secondary agricultural education instructors have taken one course related to microcomputers. Responses ranged from 0 to 3. Responses on typing skill ranged from "hunt and peck" to "fast," with the mean response of "slow".

Research objective one sought to determine the level of computer anxiety among secondary agricultural education teachers. The Computer Anxiety score (COMPAS) for these secondary agricultural education teachers ranged from 20 to 86, with 20 being relaxed and 86 being very anxious. The mean score was 47.3 or generally relaxed. The summated anxiety scores of the COMPAS included 20 items. The items used on Oettings Compas were statements about computers followed by two adjectives. One adjective represented little to no anxiety, while the other adjective of the pair represented anxiety. Table 1 indicates item means ranges from 3.51 to 1.77. A one represents low to no anxiety, while a five represents much anxiety. One hundred five (59.1%) of the teachers were very relaxed to generally relaxed using the computer. Mild to severe anxiety was reported by 71 (40.9%) respondents. (See Table 2)

Table 1

COMPAS Items Descriptive Statistics

Item	Mean	S. D.
Trying to write a program in BASIC as part of a class	3.51	1.28
Reading a book about how computers can be used	3.11	1.22
When a message appears on the screen that you have not seen before	2.94	1.05
Knowing the right words or "language" when talking about using a computer	2.92	1.26
Interpreting a complicated computer printout	2.84	1.16
Deciding which type of personal computer to buy	2.48	1.29
Explaining a problem that you have not been able to solve to a computer consultant	2.42	1.09
Taking a job where you have to regularly enter data into a computer	2.28	1.35
Computers give me more or less control	2.27	1.02
Trying to use a small computer to solve math problems	2.26	1.19
Making a mistake when entering data for analysis because of nervousness	2.24	1.25
Trying to use a small computer to balance a checkbook would usually be	2.22	1.22
Correcting an error on the screen	2.18	1.25
Trying to operate a small computer when you are all alone	2.11	1.15
Learning to keep records for a small business on a computer	1.98	1.04
Learning to use a small computer to do a budget	1.97	1.06
I generally think of computers as	1.90	.97
Just hearing the word "computer" makes me feel	1.90	.94
Looking at the keyboard of a small computer	1.90	.99
Typing on a word processor instead of a typewriter	1.77	1.08

Table 2.

Computer Anxiety Score

Level of Anxiety Present	Anxiety Range	Frequency	Percent
Very Relaxed	20 - 40	74	42.0 %
Generally Relaxed	41 - 50	31	17.1 %
Mild Anxiety	51 - 65	48	27.2 %
Anxious	66 - 75	15	8.6 %
Very Anxious	76 - 100	8	4.6 %
Total		176	100.0 %

Table 3.

Multiple Regression Analysis of Demographics to the COMPAS Score (n = 176)

Source of Variation	SS	df	MS	F RATIO	Prob. of F
Regression	21323.686	4	5330.921	47.918	.0000
Residual	18801.238	169	111.249		
Total	40124.924	173	5442.170		

Variables in the equation

Variables	R	Cum R^2	F	Prob. of F.
Level	.40981	.40981	119.430	.0000
Rule	.06825	.47806	78.311	.0000
Typeskill	.03781	.51586	60.380	.0000
Yrs taught	.01557	.53143	47.918	.0000

Variables not in the Equation

Variables	t	Sign. t
Age	.098	.9220
Support	-1.181	.2393
Degree	-1.332	.1845
Gender	.487	.6267
Apply	- .113	.9100
Training	- .368	.7134
Courses	- .431	.6669
Mathability	-1.216	.2256
Factors	- .249	.8034

Objective two sought to determine the amount of variance in the computer anxiety score that could be explained by demographic variables. Current level of computer skills, student proficiency in the use of computers, typing skill of the agriculture teacher, and years of teaching experience entered into the stepwise regression equation. (See Table 3) These four variables accounted for 53.1% of the variance in the COMPAS Score. Approximately 41% of the variance was explained by the current level of computer skills. Student proficiency in the use of the microcomputer explained 6.8% of the variance. An additional 3.8% was explained by the teacher's typing skill, while years of teaching experience explained 1.6%.

The data show that the number of courses taken related to microcomputers, use of the computer, and computer training had low negative correlations with the computer anxiety score. Teachers' perception that students were more proficient at the use of computers and level of computer skill were moderately correlated with the computer anxiety score. (See Table 4)

Table 4.

Correlations between COMPAS Scores and Demographic Variables used in Regression Analysis (n = 167)

Variables	r	Strength of Correlations
Age	.2381	Little, if any
Support for computer use	- .2605	Little, if any
Degree	.0005	Little, if any
Gender	- .0889	Little, if any
Years Taught	.2473	Little, if any
Level of computer use	- .6440	Moderate
Computer Training	- .3946	Low
Courses	- .3105	Low
Use of the computer	- .4400	Low
Are students more proficient	- .5404	Moderate
Math ability	- .0734	Little, if any
Factors that prohibit use	.0152	Little, if any

Note: Strength of Correlation based on to Hinkle, Wiersma, and Jurs (1979) Applied statistics for the behavorial sciences. Chicago: Rand McNally College Publishing.

Objective three determined other factors as preceived by secondary agricultural education teachers that prohibited the use of the microcomputer in their agricultural education classroom.(See Table 5) Number of computers was the factor given by 27.8 of the respondents, while good software was given by 17%. Both time, money and/or budget was rated as the next highest by 16 % each. Teachers knowledge was ranked fourth by 10% of the respondents.

Table 5.

Factors Perceived by the Secondary Agriculture Teachers that prohibit the use of the Microcomputer in their classrooms.

Factors Given	Frequency[a]	Percent[b]
Number of computers	49	27.8 %
Good software	30	17.1 %
Time	28	16.0 %
Money/Budget	28	16.0 %
Teacher knowledge	18	10.2 %
Facilities/security	11	6.2 %
Equipment outdated	3	1.7 %
Administrative support	2	1.2 %
Student knowledge	1	.6 %

[a] Frequencies add to more than 176.

[b] Percentages do not add to 100 because of the number that didn't give factors.

IMPLICATIONS

1. Increasing knowledge about computers is one way to overcome computer anxiety.

2. If secondary agriculture teachers were to increase the use of the computer and their typing skills, their level of computer anxiety will go down.

3. Even though agricultural education teachers are experiencing some anxiety, it appears not to be higher than the norm reported by Oetting (1983).

4. Mathematical ability appears not to have any effect on the computer anxiety and should not be offered as an explanation for this condition.

5. The more course work or knowledge a person has, less computer anxiety is exhibited.

6. If secondary agricultural education teachers were supported in their use of the computer by their principal, vocational supervisor/director, superintendent, school board, state staff, teacher educators, and administrators on the local and state levels more computers would be found in agricultural education departments.

7. Those teachers who have taught 10 years or fewer need instruction regarding computer usage that differs from those teachers having taught more than 10 years.

8. Age of teacher and degree held are not factors in computer anxiety and should not be used in course application and inservice workshop planning.

9. More funds should be made available on the state and local levels for the purchase of microcomputers and good software for the secondary agricultural education departments.

RECOMMENDATIONS

1. Additional computer courses need to be incorporated into programs of study for students presently enrolled in teacher education programs.

2. In-service training should be developed using computer tutorials to help the secondary agricultural education teachers become comfortable with computers. These inservice training programs will decrease anxiety and increase computer competence and knowledge.

3. Agriculture teacher educators should consider current level of computer skills, student proficiency in computers, typing or keyboarding skills of the secondary agricultural education teacher and the number of years of teaching experience when designing computer courses or inservice for teachers.

4. Agriculture teacher educators can give support to the agriculture teachers by assisting then in writing grant proposals to purchase microcomputers and software to enhance their agriculture departments.

5. Administrative support needs to be strengthened. Efforts should be made to enhance the perceptions of administrative personnel toward the values of computers in secondary agricultural education.

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FACTORS PREVENTING MICROCOMPUTER USE AMONG SECONDARY AGRICULTURE EDUCATION TEACHERS IN THE UNITED STATES

A Critique

Max B. McGhee, University of Florida -- Discussant

Fletcher and Deeds have conducted a most important study about computer anxiety and other factors which might explain variations in microcomputer use. This national study was timely and provided some interesting findings which support the need for action on by many segments of the agricultural education system.

The study was based on a sound conceptual framework which drew from previous research and theory that established a need for this investigation. The instrument used was developed using recommended procedures. The reliability coefficients of both parts of the instrument were quite satisfactory (.90 and .96). I commend the researchers on the use of a previously developed anxiety scale (COMPAS), although I was unable to find it in the reference list. Their response rate of 81.9% was good, although Borg and Gall (1983) indicate that this is sufficient, I would feel more confident in the results had some attempt at non-response follow-up been done.

The findings of the study were presented in a clear, concise manner. We found out that the more competence we have with computers, the less anxious we tend to be. Although not too surprising, the research also found that the other three variables entered into the regression equation did not explain but seven percent of the variance. Also the logical response by teachers of "more computers in the classroom" will help to increase the use of computers is as would have been expected. Of course, as the researchers point out, the number of computers available is a function of monetary support provided by those who control the purse strings.

The implications of this study were well-founded, however, I would like to know what kind of "differing instruction" teachers with less than 10 years experience need as opposed to those with more experience (#7).

Recommendations made are appropriate based on the findings. I would add that much of what is to be in the agricultural classroom throughout the country depends, in large part, to experiences we as teacher educators can provide prospective and incumbent teachers. We must help them to learn the basics of computer USE, identify and evaluate appropriate software, and develop strategies to obtain hardware to incorporate useful student experiences into their progams.

This was a well designed, executed, and reported study. It confirms previous held beliefs and can be good base for future research on the factors affecting computer use in agricultural education.

SELF-PERCEPTION OF GENDER BIAS AMONG WOMEN AGRICULTURE TEACHERS

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INTRODUCTION

Significant strides have been made in the past few decades in addressing gender bias in a variety of professions. The educational profession has lent its weight to providing greater gender-equity by conducting many student-centered studies. Becker (1982) found that when prospective teachers graduate from teacher education programs with different expectations for their students based on gender, subsequent classroom interactions between students and teachers will reflect those biases. These biases have manifested themselves in how teachers treat male and female students. Jones (1989) estimated in her meta-analysis of gender differences in teacher-student interactions, that teachers spend an average of 56 percent of their time with male students compared with 44 percent with female students.

In a study looking at hiring practices, Stericker (1981) had male and female undergraduates read six job descriptions which varied the personal pronouns used for the job holder from "he" or "she" or "they". Stericker concluded that when masculine pronouns were used, the estimated chances of getting the job decreased dramatically among females.

During the 1988-89 school year, Foster and Pikkert (1988) found only 33 female agricultural education teachers out of approximately 900 positions in the states of Colorado, Iowa, Kansas, Missouri, Nebraska, and South Dakota. This led to their conclusion that agricultural education is still a strongly male dominated field.

Of those women who do teach secondary agriculture in Ohio, Knight (1987) found that at least one-third reported gender bias against them at some point in their careers by administrators and other male teachers of agriculture.

Cano (1990) found that female agricultural teachers perceived sexual bias toward them by members of the community in which they worked. Cano also found that female teachers were not being nominated proportionately to male teachers for leadership positions at the district and state levels of the profession.

PURPOSE OF THIS STUDY

The primary purpose of this study was to determine whether females who successfully entered agricultural education as their primary career perceived bias toward them from fellow teachers, administrators, students, or community members. In addition, if gender bias did exist, this study sought to determine how women coped with working in the traditionally male dominated teaching area of agricultural education.

PROCEDURES

RESEARCH PARTICIPANTS

All female secondary agricultural education teachers employed in the six states of Colorado, Iowa, Kansas, Missouri, Nebraska, and South Dakota were included in the study. The initial response rate included all 33 women teaching secondary agriculture at that time. Two of the 33 questionnaires were not included in the data because the qualitative portions of the survey were not completed.

SURVEY QUESTIONNAIRE

The survey design had both a qualitative and quantitative component. The first section attempted to determine perceived sources of bias among fellow teachers, people in the community, administrators and students. Participants responded using a four point, bi-polar scale where "1" indicated strongly agree, "2" indicated agree, "3" indicated disagree, and "4" indicated they strongly disagreed with the statement. The second portion of the survey provide open-ended, qualitative response questions.

A jury of professional agricultural education researchers reviewed the survey instrument for face validity. In addition, two former female agricultural education teachers reviewed the survey instrument for validity and made suggestions for improvement. The survey was revised prior to mailing to study participants.

DATA COLLECTION

Questionnaires were mailed to all female secondary agricultural education teachers in a six-state, midwestern region. All teachers were advised in a cover letter that the purpose of the study was to determine self-perception of bias toward female agriculture teachers. All participants were assured of the confidentiality of their responses. The return rate was 100 percent.

ANALYSIS OF DATA

The Statistical Package for the Social Sciences (SPSS-X) was used to analyze data associated with this research. Means and standard deviations were computed on all questions requiring an agreement rating response. The SPSS-X Reliability (post hoc) test was used to determine survey reliability. A reliability coefficient of r=.86 was determined for the entire instrument.

A qualitative analysis was completed on the open-ended responses in the questionnaire. Broad categories of responses were initially defined which were broken down into subcategories as the data led to emerging trends that reflected gender bias and strategies for coping with bias in the secondary agricultural education teaching field (Miles and Huberman, 1984).

RESULTS

QUANTITATIVE DATA FROM RESPONDENTS

Demographics: It was observed that female teachers in this study taught secondary agricultural education an average of 3.5 years. Sixty-five percent had a farm background and 52 percent had enrolled in agricultural education classes while they were in high school. Of the six states, Iowa and Missouri had the greatest number of female teachers (12 and 8 respectively). Others states were observed to have four or less female teachers employed as agricultural education during the 1988-89.

Perceptions of bias in teaching: Table 1 describes the perceptions of female agriculture teachers regarding gender bias experienced as agriculture teachers. When looking at perceptions of bias coming from those persons with whom female teachers work, it was observed that they currently felt little bias expressed toward them in their current position. They disagreed with the following statements:

- My students would rather have a male teacher (3.47)
- Other teachers have a hard time accepting me (3.08)
- Administrators were reluctant to hire me (2.88)
- I do not receive adequate administrative support (3.30)
- Parents are not happy with a women teacher (3.33)
- I run into resistance from employers in the community not wanting to deal with a women teacher (3.11)
- Employers in the community don't take me as seriously as they would a male teacher (3.25)

Women teachers did agree with the following statements:

- Fellow teachers treat me like an equal (2.19)
- Parents have accepted me in my current position (1.81).

When expressing whether they have difficulty with any particular teaching segment of the agricultural education program, women teachers expressed confidence in their ability to do well in all major program areas. They were in agreement with the following statements:

- I enjoy working with adult and young farmers (1.73)
- I feel comfortable making SAE visits (1.58)
- I enjoy teaching agricultural mechanics (1.87)
- I encounter few problems as a female FFA adviser (1.96).

Table 1

Self-perception of Bias Toward Female Agriculture Teachers (N=31)

Questions:	Mean	Ratings
Acceptance By Others		
1. My students would rather have a male teacher	M	3.47
	SD	.56
2. Other teachers have a hard time accepting a female agricultural education teacher	M	3.08
	SD	.64
3. Fellow teachers treat me as equal	M	2.19
	SD	.89
4. School administrators were reluctant to hire a female agricultural education instructor	M	2.88
	SD	.94
5. I do not receive adequate support from administrators because I am female	M	3.30
	SD	.60
6. My students' parents are generally not happy a women teaching agricultural education	M	3.33
	SD	.65
7. Parents have accepted me in my position as agricultural education instructor	M	1.81
	SD	.69
8. I run into resistance from employers who do not want to deal with female agriculture education teachers	M	3.11
	SD	.75
9. Employers do not take me as seriously as they would a male teacher.	M	3.25
	SD	.64
Satisfaction With Professional Ability		
10. I enjoy working with adult farmers, young farmers, and/or FFA alumni	M	1.73
	SD	.58
11. I feel quite comfortable in making SAE visits	M	1.58
	SD	.57
12. I enjoy teaching in the agricultural mechanics laboratory	M	1.87
	SD	.77
13. I encounter few problems as a female FFA adviser	M	1.96
	SD	.56
14. I'm happy in my present position	M	1.60
	SD	.65

Note: M=Mean calculated from a scale where 1=strongly agree, 2=agree, 3=disagree, and 4=strongly disagree. SD=Standard Deviation

Table 1 (continued)

Questions:	Mean	Ratings
15. I would encourage other women to join the agricultural education profession	M SD	1.58 .50

Note: M=Mean calculated from a scale where 1=strongly agree, 2=agree, 3=disagree, and 4=strongly disagree. SD=Standard Deviation

Female teachers also expressed satisfaction with their overall role as an agricultural educator. They reported:

- I am happy in my present position (1.60)
- I would encourage other women to enter the agricultural education teaching profession (1.58).

As can be observed, female teachers with an average of 3.5 years of experience indicated the presence of little or no gender bias in their current activities as agricultural educators.

QUALITATIVE DATA FROM RESPONDENTS

When asked to respond to open-ended questions regarding gender bias and ways of coping with bias, the following responses were recorded: (Note: The number of similar opinions expressed are indicated at the end of each statement. Some respondents provided multiple responses and some elected not to respond to some questions as all.)

Question: Does gender bias deter women from becoming secondary agriculture teachers? (25 total responses)

- Yes, gender bias is a deterrent to some women who might otherwise teach agricultural education (18)
- No, gender bias is not a deterrent (4)
- Yes, but it is not publicly displayed (2)
- It may be, but I have not encountered it (1)
- Time demand is more a deterrent than gender bias (1)
- Female teachers get more support than male teachers (1)

Question: What factors do you believe contributes to the low number of females teaching secondary agriculture? (31 responses)

- The area is traditionally male dominated (9)
- Acceptance by the community is difficult (7)
- Too much stress/time on the job (7)
- Not knowledgeable enough in agricultural subjects (5)
- Lack of support from friends and family (4)
- Lack of professional support/role models (4)
- Administrators just don't hire women (3)
- No encouragement from universities/professors (3)

Question: What factors were important in gaining acceptance as a secondary agricultural education teacher? (31 responses)

- Being knowledgeable in the agricultural field (15)
- Exerting special efforts to be successful (13)
  - Showing a willingness to learn
  - Being yourself and doing your best
  - Being honest; admitting the things you don't know
  - Being consistent and fair with students
  - Working hard to set an example to students
  - Being open-minded
- Developing good community support (12)
- Developing relationships with parents (5)
- Working on the prevailing attitudes of the community (3)

Question: What were the reasons for you wanting to enter the agricultural education profession? (31 responses)

- Love of agriculture (20)
- Enjoyment of working with youth (9)
- Extension of Vo Ag/FFA in high school (8)
- Love of teaching (7)

Question: What can be done to encourage more women to enter the agricultural education field? (28 responses)

- Change the attitudes against female teachers (7)
- Increase the salary for all teachers (4)
- Increase the acceptance by administrators (4)
- Improve teacher education programs (4)
- Encourage females to choose agricultural education (4)
- Provide a support base for females in agriculture (4)
- Project a positive image for female teachers (3)
- Increase scholarships and recruitment of females (3)

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions were drawn from the findings of this study.

1. Female teachers with at least 3 years of experience teaching agricultural education may not generally experience overt gender bias in their current position. However, since there were relatively few women teaching in the six states in this study, gender bias may have played a role in causing other females to decide not to enter or to leave the profession.

2. Established female teachers expressed satisfaction with their current positions and encouraged other women to consider agricultural education as a career choice.

3. Generally, female teachers indicated satisfaction with their ability to fulfill the role of an agricultural instructor.

4. Gender bias is viewed as a definite deterrent to women entering the agricultural education teaching profession.

5. Respondents reported a variety of reasons for the low number of women entering secondary agriculture instruction. Reasons centered around traditional role expectation, administrator and community attitudes, and a lack of support from university professors, family, friends, and other teachers.

6. Female teachers expressed being knowledgeable in the field, developing good community/parent relations, and making special efforts of a personal nature helped them gain acceptance.

7. The respondents initially wanted to teach because of an interest in agriculture, the enjoyment of working with youth, previous ties to Vo Ag/FFA, and a love of teaching.

8. More women could be encouraged to enter the profession by changing current attitudes against women teachers in agriculture, increasing salaries, increasing acceptance by administrators, improving teacher education programs, building support networks, and increasing scholarship and recruitment efforts.

RECOMMENDATIONS

Based on the conclusions of this study, the following recommendations are suggested.

1. University faculty preparing women to be secondary agricultural education teachers should adopt strategies to:
   a. strengthen the confidence of female students in their ability to be agriculture teachers,
   b. provide gender sensitivity training for both male and female students enrolled in agricultural education,
   c. provide access to positive female role models for all students enrolled in teacher education classes,
   d. promote careers in agricultural education to, and for, all students regardless of gender,
   e. increase scholarship opportunities for female students,
   f. provide students with early experience activities which includes exposure to women teachers in agriculture.

2. Promotional materials should be developed to attract female students and to encourage them to seriously consider agricultural education as a career. Such materials should promote a career in agricultural education as a way for women teachers to utilize their love for teaching youth about agriculture, while maintaining ties to the secondary agriculture and FFA program.

3. Female students should have access to successful women secondary and university teachers as role models.

4. Gender sensitivity programs to increase the acceptance of female teachers by school administrators and experienced male agriculture teachers (peers) should be implemented at once.

5. Every effort should be made to hire qualified females as secondary agricultural educators to expedite the process of integrating women into the agricultural teaching profession. Adolescent female students are in need of professional role models at the high school level and may be influenced to enter agricultural education as a college major.

6. Every effort should be made to provide a support system for women wishing to enter a traditionally male-dominated career area, both during the preparation phase as well as during the initial three years of employment.

7. A high quality first year teacher follow-up program for women teachers should be maintained to address problems associated with gender bias as they occur.

8. The state and national leadership in the agricultural education profession should illustrate their commitment to eliminating gender bias by establishing appropriate support networks for female agriculture teachers.

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SELF PERCEPTION OF GENDER BIAS AMONG WOMEN AGRICULTURE TEACHERS

A Critique

Max B. McGhee, University of Florida -- Discussant

Gender bias is an important and much researched topic. The unconscious bias toward those who do not seem to "fit" in our profession that many of us might harbor may not manifest itself openly. However, according to the adage "perception IS reality," the results of this study show that although gender bias does deter some women from teaching agriculture, those 33 who are now in the profession in the states studied feel little bias. I found this to be an interesting study and one that should be expanded both theoretically and geographically.

I would commend the research team for their use of previous research to build a conceptual framework. The 100% response rate, reliability/validity checks, clarity in presentation of findings, and well-founded conclusions and recommendations must also be noted.

Relative to ideas for improvement and recommendations for further study, a better theoretical framework would result in a clearer definition of why the selected variables were chosen for investigation in the study. Although not the purpose of this study, I would like to see a national study conducted which sought to identify the extent of perceived gender bias. It should be pointed out that there are some states (i.e. Florida) that have a larger number (100) and percentage (20.3) of females in the profession and it would be interesting to see if they perceive any bias toward or against them.

In summary, I enjoyed reading and learning about this study and look forward to additional research in this area.

EDUCATIONAL INFLUENCES AFFECTING DECISIONS REGARDING THE CONTINUATION OF ALTERNATIVE AGRICULTURAL ENTERPRISES AS PERCEIVED BY OKLAHOMA FARMERS AND RANCHERS

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INTRODUCTION

A suppressed agricultural economy during the 1980s brought about a need for agricultural enterprises that were profitable. Traditional agricultural enterprises in Oklahoma, especially beef and wheat, suffered from large supplies with little demand. Alternative agricultural enterprises were perceived to be part of a possible solution to aid producers in abating some of the negative economic effects they encountered during those times by diversifying their operations and reducing their dependency on traditional crops (Gallatin, 1989).

Diffusion is a special kind of communication in which messages are concerned with new ideas (Rogers, 1983). Keating (1989) noted that "education is the cornerstone of adoption of new ideas, practices, and technology by adults in agriculture" (p. 17). To enhance the adoption of alternative agricultural enterprises, the Wes Watkins Agriculture Research and Extension Center in Lane, Oklahoma, was established to demonstrate and disseminate new information and alternative agricultural approaches to potential producers (Harritt, 1985). Concomitant with the development of this center, a three-part longitudinal study was initiated in 1985. The first study provided perceptions and opinions of change agents, County Extension Agents and Vocational Agricultural Instructors in Southeastern Oklahoma concerning the factors which might influence producers' adoption of alternative agricultural enterprises (Harritt, 1987). The second study, conducted by Gallatin (1989), identified producers' perceptions of factors influencing adoption of alternative agricultural enterprises. Following that study information was needed concerning factors influencing continuation of alternative agricultural enterprises.

Springer (1981) noted "information is the giving out of data, the delivery of material. Communication is getting through to the people, and for a given purpose" (p. 17). Information needed to encourage continuation of alternative agricultural enterprises required the audience to be defined, the needed information determined, and the most effective means of delivery decided (Keating, 1989).

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the educational influences that affect decisions regarding the continuation and discontinuation of alternative agricultural enterprises as perceived by Oklahoma farmers and ranchers identified as being engaged in alternative agricultural enterprises. The study was intended to provide information regarding: (1) the sources of information used by the producers continuing alternative agricultural enterprises, (2) the perceived effectiveness of the information sources, (3) the extent to which the producers were serving as information sources themselves, (4) perceived information needs of the producers, and (5) the preferred information delivery methods.

PROCEDURES

The population for this study was the 477 Oklahoma farmers and ranchers identified in Gallatin's study (1989) as starting any agricultural enterprise chosen as an alternative to the traditional enterprise to enhance their economic position between 1980 and 1990. There were 24 non-respondents. This results in 453 alternative agricultural enterprise producer respondents for the study and a 95% response rate.

The instrument was developed by the researcher based on a review of related literature. A panel of experts and a field test of producers established the content validity for the instrument. Producers were asked to identify information needs and sources, the extent to which they themselves were information sources, and preferred delivery systems. Information sources identified by the producers were rated by the producer for effectiveness on a five-point Likert-type scale (1 not effective, 2 slightly effective, 3 moderately effective, 4 highly effective, 5 extremely effective). Due to the qualitative nature of the instrument, reliability coefficients were considered impractical.

Information involving perceptions, attitudes, and opinions was quantified so descriptive statistical procedures including frequencies, means, standard deviations, and percentages could be utilized. Analysis of the quantitative data was done using the SAS Computer Package.

FINDINGS

A large majority of the respondents (372 or 82%) continued one or more of the alternative agricultural enterprises tried. Only 18% of the 453 producers discontinued all alternative enterprises they had tried. Mean years of involvement for the continued group was 5.66.

Gallatin (1989) identified other farmers, Cooperative Extension Fact Sheets, County Extension Agents, State and Area Extension Specialists, and monthly and weekly farm publications respectively as preferred sources of information for alternative agricultural enterprise start-ups. By contrast in this study, producers continuing alternative agricultural enterprises identified State and Area Extension Specialists as the most preferred source of information. One hundred forty-five (32%) producers identified this group as a primary source of information. Ninety-one (20.1%) producers identified the County Extension Agent as a primary source of information. Seventy of the producers (15.5%) identified monthly or weekly farm publications as a primary source of information. Sixty-seven producers (14.80%) identified other farmers. A combined 62% of the producers surveyed used various components (fact sheets, agents, etc.) of the Cooperative Extension Education process as a primary source of information. All sources were rated as highly effective in providing useful information.

Insert Table I about here.

Alternative agricultural enterprise producers themselves were instrumental in disseminating information. Of the 453 producers, 292 (65%) indicated that they provided information to one or more persons who were interested in starting-up an alternative agricultural enterprise.

Producers perceived production, market, and labor information as the most important information needed regarding the alternative agricultural enterprise. Two hundred one producers (45%) indicated a need for information regarding production practices. One hundred twenty-one producers (27%) indicated a need for market information. Forty-eight producers (11%) indicated a need for labor information.

Preferred methods of information dissemination were identified. A majority of the producers indicated they preferred printed material and person-to-person delivery of information. Printed material was identified 237 times as a preferred method of delivery, while person-to-person delivery was identified 226 times as a preferred method of delivery.

Insert Table II about here.

CONCLUSIONS AND RECOMMENDATIONS

Producers of alternative agricultural enterprises preferred information from the county, state, and area levels of the Cooperative Extension Service. The Cooperative Extension Service, as a preferred source of information, should continue to make sure that information regarding alternative agricultural enterprises is available from the county, area, and state levels to insure that producers have the best and most up-to-date information available.

Producers serve as an important and effective source of information. The Cooperative Extension Service and Agricultural Education profession should utilize more producer expertise in developing educational materials and programs. Furthermore, the change agents should more fully recognize the producers as legitimate sources of information.

Diffusion of information concerning production practices and marketing is necessary for continuation of alternative agricultural enterprises. The Cooperative Extension Service and Agricultural Education Instructors should disseminate more information regarding production practice and market possibilities on various alternative agricultural enterprises based on identified producer needs.

Producers prefer information disseminated by written material and person-to-person contact. The Cooperative Extension Service should continue to focus on delivery methods that enhance person-to-person contact with written materials provided for future reference.

Some educational implications are very evident. The dissemination of information by Cooperative Extension personnel is an important component to sustain a successful adoption process. It was evident these disseminators, especially Extension specialists, became more important as the adoption process continued (moved from innovations to continuation of a practice) and the needs of the clientele became more specialized. A successful agriculture will depend on future innovations. Successful continuation of these innovations will depend in part on dissemination of useful information.

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APPENDIX A

TABLE I

PREFERRED INFORMATION SOURCES

	Frequency Distribution		Effectiveness	
Information Source	n (453)	%	X	S.D.
State or Area Extension Specialists	145	32.00	4.34	.70
County Extension Agents	91	20.10	4.19	.89
Monthly or Weekly Farm Publications	70	15.50	3.61	.92
Other Farmers	67	14.80	4.15	.84
Grower Organizations	47	10.40	4.29	.86
Extension Fact Sheets and Newsletters	46	10.20	4.15	.63
Short Courses	32	7.10	4.37	.86
Professional Consultants	22	4.90	4.00	.69
Manufacturer or Supplier Representatives	19	4.20	3.89	.80
County ASCS or SCS Personnel	15	3.30	3.93	.96
Buyer or Processor Representatives	14	3.10	3.85	.80
Agricultural Education Instructors	12	2.60	4.08	.79
Experience	9	2.00	3.77	.83
Others (less than 2% books, television, radio, seminars, USDA, newspapers)	32	6.90		

Effectiveness Scale: 1 not effective, 2 slightly effective, 3 moderately effective, 4 highly effective, 5 extremely effective.

TABLE II

PREFERRED METHODS OF INFORMATION DELIVERY AND INFORMATION NEEDS

Method	Frequency	Needs	Frequency	
	N		N	%
Printed Material	237	Production Practices	201	43.22
Person to Person	226	Market Information	121	26.02
Conferences	69	Labor Information	48	10.32
Video Tapes	57	Financial Information	42	9.03
Short Courses	50	Resource Information	37	7.96
Teleconferences	18	Other (less than 10%)	16	3.23

EDUCATIONAL INFLUENCES AFFECTING DECISIONS REGARDING THE CONTINUATION OF ALTERNATIVE AGRICULTURAL ENTERPRISES AS PERCEIVED BY OKLAHOMA FARMERS AND RANCHERS

A Critique

Gary E. Briers, Texas A&M University--Discussant

This research reminds us of our heritage. It is an important effort to serve production agriculture and to study agricultural producers. This study and others in Dr. Key's research program have sought to do just that. The program of which this study is a part is an evaluation of the change process and of factors involved in technological change. Study of the innovation-decision process has its roots in agriculture--no pun intended! This descriptive study gives us insights into the role of change agents and sources of information during what Rogers calls the "confirmation stage" of the change process. The researchers were persistent, well-liked, or lucky to get a response rate of 95% from farmers and ranchers. We all need your secret! Instrumentation was simple and straight-forward. Likewise, findings were descriptive in nature. Data analyses did not "exceed" the methodology used in collecting data. Finally, conclusions and recommendations, for the most part, were based on findings.

Now, what changes might be suggested? As a beef producer, I question the validity of the reference to beef's suffering from large supplies with little demand during the 1980s and the negative economic effects. I admit, however, that if Oklahoma beef producers could not make money in the 1980s, then they need to diversify their operations and reduce their dependency on traditional crops! Unclear to me about the data collection instrument was what questions subjects were asked or what directions they were given. For example, I believe that subjects were not limited to identifying one primary source of information. (Frequency counts in Table 1 exceed total N of 453 producers.) So, to what question were they asked to respond? Did they assess the effectiveness only of their "primary" sources of information? If so, then one could guess that the sources identified would be judged as effective. Because all 453 respondents--even the 79 who discontinued all alternative enterprises--completed the instrument and because respondents did not choose one preferred source, it may be inaccurate that "producers continuing alternative agricultural enterprises identified State and Area Extension Agents as the most preferred source of information." Also, because producers could respond with more than one source of information, it may be incorrect that 62% of the producers used Cooperative Extension as a primary source of information. I suspect that many producers who identified State or Area Extension specialists also identified County Extension agents or Extension fact sheets. "Short courses" as an information source would be more helpful if we knew who provided the short courses. ("Short courses" as a preferred method is helpful.) Too, where do "salespeople" come into the picture--as "supplier representatives"? Specifications for papers allowed for a more detailed report. I suggest that this report be extended to be more descriptive of questions asked and of methods of responding.

As part of a programmatic effort, this study contributes to the overall evaluation of efforts to enhance the adoption of alternative agricultural enterprises. Together, the studies in this series can help us to understand the adoption process and the role of agricultural education in that process.

FACTORS RELATED TO TEACHING STYLE PREFERENCE OF OHIO COOPERATIVE EXTENSION SERVICE FACULTY AND PROGRAM STAFF

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INTRODUCTION

The Cooperative Extension Service is one of the world's largest adult education organizations. According to Boone, (1985, p. 265), "the Cooperative Extension Service.. is the world's largest publicly supported informal adult education and development organization.. with over half a century of recognized achievement, it is America's first (and only) national system in adult education." The Cooperative Extension Service's unique network provides professional educators/staff in almost every U.S. county in all states to provide linkage for dissemination of research-based knowledge to clientele. Through it's structure and organization, it provides a system for lifelong learning (Prawl, Medlin, and Gross, 1984, p. 26).

From it's very beginning the Cooperative Extension Service philosophy has been one of advocating positive, lifelong, individual and behavioral change. Cooperative Extension workers are educators of adults. They instruct adult audiences through formal group instruction as well as small group and one-to-one consultations. Practical research relevant to the needs and concerns of constituents is conducted and disseminated. The Cooperative Extension Service is in the forefront of lifelong learning and behavioral change for the adult learner. Based on this mission, the assumption could be made that Extension educators possess the knowledge and skills needed to anticipate and recognize adult needs and direct learning activities to adequately address those needs. Believing this, the principles of adult education as the foundation for learning should be evident in the teaching styles of Cooperative Extension Faculty and Program Staff. The role of the teacher/educator has more recently become a focus in adult education literature. While no consistent definition of teaching style has emerged, it is commonly believed that an educator will over time perform to their strengths (Heimlich, 1990). Knowing one's strengths and how to adapt them to maximize student learning should be the goal of every adult educator.

PURPOSE AND OBJECTIVES

The primary focus of this study was to determine the factors related to the teaching style preference of the Ohio Cooperative Extension Service (OCES) Faculty and Program Staff as measured on the Principles of Adult Learning Scale (PALS) (Conti, 1978). Additionally, this study sought to look at two additional measurements predictive of teaching behavior: sensitivity and inclusion as measured by the Van Tilburg/Heimlich

Sensitivity/Inclusion Scale (Van Tilburg/Heimlich, 1990). Also examined were the respondents' attitudes toward their roles as an adult educator and their knowledge regarding basic adult education principles and practices. The main dependent variable in this study was the score on PALS. The independent variable characteristics included: 1) attitude toward perceived role as an adult educator, 2) knowledge of basic adult education principles and practices, 3) sensitivity of the instructor to the students' needs, 4) inclusion by the instructor of students in the design of their own learning experiences, 5) major program area of study, 6) current professional position, 7) number of years employed, 8) highest educational degree, 9) academic major in highest educational degree, 10) number of adult education classes taken, 11) teaching experience outside of the Cooperative Extension Service, 12) gender, and 13) age. Specific objectives included:

1. To describe the Faculty and Program Staff of the Ohio Cooperative Extension Service on all characteristics.

2. To describe the relationship between selected antecedent characteristics.

3. To describe the relationship between all antecedent characteristics and the dependent variable.

4. To determine the best predictor(s) of the dependent variable, teaching style preference as measured by PALS."

PROCEDURES

Instrumentation

A census was conducted using all OCES employees involved in providing some form of adult education (N = 609). Individuals from county, district and state level positions representing all program areas were included. A mail questionnaire, developed by the researchers was administered. Likert-type summated scales were used to measure attitude, knowledge, and teaching style preference as determined by PALS. Sensitivity and Inclusion were measured using two Thurstone equal-appearing interval scales. The PALS scale (Conti, 1978) was adapted, with assistance from the author for use with Extension audiences.

Reliability and Validity

A panel of experts deemed the entire instrument valid. The Cronbach's Alpha coefficients were calculated for the measurement of attitude. A coefficient of .69 was achieved on the 15 item summated scale. Knowledge was measured using a ten item dichotomous scale (agree/disagree). The Kuder-Richardson 20 (KR20) test for internal consistency was used. An alpha level of .72 was achieved. The retest method was used to determine reliability of the PALS instrument. The data generated from the test and retest were used to calculate a Pearson correlation of .92. The Van Tilburg/Heimlich Sensitivity-Inclusion Measure was deemed reliable using the parallel forms procedure. For this measure, the same population (n = 16) completed similar forms of the instrument within a few weeks of one another. A coefficient of equivalence (.72) was produced when the two sets of scores obtained were correlated.

Data Collection

Procedures outlined in the Total Design Method for Surveys recommended by Dillman (1978) were used to collect data in the winter of 1990. One follow-up was conducted and a final response rate of 74.9 percent (n = 454) was obtained. Ten percent of the non-respondents from each of the professional position categories were randomly selected and interviewed by telephone. Differences between respondents and non-respondents were examined through the use of t-tests. The t-tests yielded no significant differences between groups. Miller and Smith (1983) suggest that since the data were similar, they can be pooled and generalized to the population.

DATA ANALYSIS

Descriptive statistics were first used to summarize and organize the data. The first objective of this study was to describe the faculty and program staff of the Ohio Cooperative Extension Service on selected characteristics. Frequencies, percentages, measures of central tendency and variability were used to describe the data. A second purpose of the study was to determine the extent that relationships exist between selected characteristics. Measures of Association were used to determine the nature and strength of the relationship between variables. Davis' (1971) conventions for describing measures of association were used. Stepwise multiple regression was used to determine the best predictor(s) of the dependent variable. Characteristics entered into the stepwise regression model were selected based on size of the correlation coefficient. The total R^2 was computed to determine the amount of variance accounted for by the linear combination of antecedent characteristics.

RESULTS

Ohio Cooperative Extension Service employees exhibited low levels of knowledge related to basic adult education principles and practices. Respondent's knowledge was measured using a ten item true and false test. The range of scores for this measure was 0 (none) to nine. The mean scores for all respondents was 4.81. A total of 69.5 percent received a score of five or lower, indicating that they had responded incorrectly to at least 50 percent of the statements. A limitation of this measure is the recognition that a ten item test is not a comprehensive measure of knowledge, however what was addressed in the ten items was the basic practices, beliefs, and assumptions found in the current literature. Based on the overall scores achieved it can be determined that OCES employees have a limited understanding and knowledge of these basic principles and practices of adult education.

Attitude toward being and adult educator was found to be neutral to slightly positive. Mean scores were calculated based on a one to five Likert type scale with 1 = Strongly

Disagree and 5 = Strongly Agree. A score of three would be average or neutral. All individuals score in the three to four range. The mean score was 3.51.

Scores on the Principles of Adult Learning Scale (PALS) indicated that OCES Faculty and Program Staff posses a more teacher centered behavior pattern than the norm. PALS is a summated six-point Likert-type scale with values from zero to five. Respondents were asked to indicate the frequency in which they practiced the items described in the forty-four statements. The score when summed ranged in value form 0 - 220. The higher the score, the more learner-centered are the behaviors of the teacher. The range of scores from this study was 90 to 176 with a mean of 133.4. The normed mean for the instrument is 146. In addition to measuring an overall pattern of behavior, the PALS instrument contains seven different constructs. They are: 1) Learner Centered Activities; 2)Personalizing Instruction; 3) Relating to Experience; 4) Assessing Student Needs; 5) Climate Building; 6) Participation in the Learning Process; and 7) Flexibility for Personal Development. Scores for six of the seven constructs fell below the normal average for the instrument. OCES employees scored slightly above average on the construct of "involving learners in the learning process."

Two Thurstone scales (one for sensitivity and one for inclusion) were completed by the respondents. Each scale contained eleven items describing teaching behavior. Inclusion refers to the extent that the instructor involves his/her students in the planning and design of their own learning experiences. Sensitivity measures the degree of awareness of the educator to the needs and concerns of his/her students. The majority of OCES Faculty and Program Staff scored in the range of 6.0 to 7.9, which according to Van Tilburg and Heimlich (1990) indicate an uncertainty in preference and a lack of predictability in performance, but clarity on inculturated socially desirable teaching behavior.

The majority of OCES employees (56.4 percent) reported their academic major in their highest educational degree in a technical subject matter area and not in the field of education. More than 52 percent of employees had not taken formal classes in the area of adult education. The number of individuals reporting prior teaching experience outside of the Cooperative Extension Service was only slightly lower than those with no experience, however of those with prior experience, a significant percentage was with youth and not adult audiences.

Davis' (1971) conventions for describing measures of association were used to explore relationships between selected characteristics. Most relationships between the dependent variable (score on PALS) and selected characteristics were found to be of a low or moderate positive association. The highest relationships were found with the characteristics of attitude (.21), sensitivity (.26), inclusion (.22), and number of adult education classes taken (.17).

Stepwise multiple regression was used to address objective four. Four antecedent characteristics were found to be the best combination of variables to predict the dependent variable, "teaching style preference as measured by PALS." In order of most to least variance accounted for, they were sensitivity, inclusion, number of adult education classes taken and attitude. However, the total amount of variance accounted for by the linear combination of the four characteristics was 16 percent ($R^2 = .155$). The single best predictor was "sensitivity" which accounted for nine percent of the variance.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Ohio Cooperative Extension Service Faculty and Program Staff overall exhibited low levels of knowledge of adult education practices and principles as related to the current literature. They indicated a neutral to slightly positive attitude toward their role as an adult educator.

On the dimensions of sensitivity and inclusion, the tendency to support the socially desirable responses were evident as the majority of scores reflected an ambiguity of a clarified style and a preference toward the high sensitivity, high inclusion mode, supporting a learner-centered orientation. However, measurement of the frequency of specific behaviors on the Principles of Adult Learning Scale (PALS) indicate a more teacher-centered style has been adopted by the majority of OCES Faculty and Program Staff. Scores on the total PALS and six of the seven factors demonstrate the OCES employees exhibit more teacher-centered tendencies than learner-centered.

While differences did exist on some of the specific characteristics examined, those differences were found to be minimal. Ohio Cooperative Extension Faculty and Program Staff were found to be similar across most characteristics defined. Educational level, professional training, number of adult education classes taken, and attitude were related to teaching style as measured by PALS. The literature is supportive of these findings. Personal factors related to background and environment, including education, previous experience and professional training, including number of adult education classes taken, have been found to be significantly related to teaching style preference (Robinson, 1979; Demming, 1986; Douglass, 1982; Pearson, 1980; and Franklin, 1989). Attitude was also more highly correlated with teaching style preference. The literature supports that attitudes, beliefs, and philosophical orientation are an integral part of an individuals preferred teaching style (Franklin, 1989; Boone, 1985; Conti, 1985; and Conti and Welborn, 1985).

The characteristics of sensitivity and inclusion and PALS were also found to be related. An investigation of the specific elements that comprise the major factors on both scales were found to not only be similar but to overlap. Through factor analysis, Van Tilburg/Heimlich defined their six factors as: 1) Basis for Instructional Method; 2) Educator's Perception of Students; 3) Educator's Perception of Self; 4) Educator's Perception of Student Needs; 5) Group Process; and 6) Classroom Methods. Conti's seven factors include: 1) Learner-centered Activities: 2) Personalizing Instruction; 3) Relating to Student Experiences; 4) Assessing Student Needs; 5) Climate Building; 6) Student Participation in the Learning Process; and 7) Flexibility for Personal Development. An analysis of the intent of each of the factors indicate an overlap in content.

The best predictors of "perceived teaching style as measured by PALS," included sensitivity, and inclusion scores, number of formal classes in the area of adult education that were taken, and the attitude of the individual. Multiple regression techniques used accounted for only sixteen percent of the total variance. Additional studies looking at different characteristics or combination of characteristics to try and explain more of the variance should be conducted. Cooperative Extension employees are a very homogeneous group, based on education, previous experience, personal background and philosophical orientation.

Recommendations

Malcolm Knowles (1970) suggests that the teacher is the single most important variable influencing the dynamics of the learning situation. Past research efforts have focused on understanding learning style of students, teaching methods, and adaption of teaching methods to student learning styles. In the past decade, there as been an emergence of the need to understand the inherent style of the educator and the impact that style has on learner outcomes. The measurement and understanding of one's style provides not only an external measure of classroom effectiveness but also serves as an internal assessment of values, beliefs, and philosophical orientation.

The Cooperative Extension Service is the world's largest informal adult education organization. Daily, Ohio Cooperative Extension service Faculty and Program Staff provide educational programs and learning opportunities for the clientele it serves. The findings of this study can be used to assist individuals in the OCES organization in making decisions regarding their personal teaching style, including decisions regarding professional development opportunities. Additionally, the findings should be made available to aid administrators in decision-making, to assist in developing guidelines and policies for hiring and retention, and for the development of personal and professional development of its employees. Specific recommendations include:

1. Attitude was determined to be one of the best "predictors" of perceived teaching style as measured by PALS. Attitudes for OCES employees were found to be neutral to slightly positive. The organization can through mission, philosophy, and action send messages to support and reward good teaching. Support and encouragement should be provided through opportunities (financial as well as time commitments) for personal and professional growth. Recognition and reward should be provided for individuals demonstrating not only "good teaching," but creative and innovative approaches to teaching-learning. Attitude change must come from within. What individuals believe to be true about themselves represents a major influence on attitude. If an Extension employee believes that the organization is supportive and committed to enhancing adult education and recognizes and rewards behavior consistent with that mission, attitude can be positively influenced.

2. Knowledge levels of adult education principles and practices possessed were found to be low. Positive relationships were found between education, number of formal adult education classes taken, highest educational degree and professional opinion. Current employees should be encouraged and provided opportunities to improve their knowledge level through personal encouragement as well as in-service training opportunities provide by the organization.

3. Professional training, including the number of formal adult education classes taken, was also one of the best "predictors" in determining teaching style. The majority of OCES

Faculty and Program Staff had little or no formal training in adult education coursework. Additionally, a review of in-service trainings offered in the past five years show that information on working with adult audiences has only briefly been addressed. The Ohio Cooperative Extension Service should require for hire, and/or continued employment some formal training in adult education.

4. OCES employees were found to be more teacher-centered than learner-centered in their approach to teaching style. It is important for individuals to understand that a preference or tendency toward one style or another is neither "good" nor "bad." It is an assessment of what is. The literature on adult teaching-learning theory supports a learner-centered or collaborative approach as optimal in many situations. However, the literature also supports that teaching style preference is a composite of an individuals' beliefs, values, and personal and professional philosophy. Individuals as well as the Cooperative Extension organization should assess their own philosophy and values and determine if the preferences determined are congruent with that philosophy. An assessment of values, and philosophy provides a foundation for considering change and future direction. The use of tools such as strategic planning, mission and values clarification, and task forces, are just a few means for guiding an organization and its' employees into planned change.

5. The organization can also assist individuals choosing to make changes or adaption. Personal development plans that provide support and encouragement for growth can be developed with the individual, their supervisors and administrators. In-service training opportunities can be provided for teacher-centered individuals desiring to make changes in their style. Opportunities for learner-centered individuals desiring to improve their effectiveness should also be made available.

6. A mentoring system, pairing teacher-centered individuals desiring to make adjustments in their personal style, with learner-centered educators could be implemented. Also, because it was found that newer employees, or those with less tenure, were more likely to be teacher-centered, a mentoring system could be beneficial to the individuals as well as to the organization. Individuals participating in a mentoring program would have the opportunity to observe and model behaviors they wish to adopt. Working with a positive role model can influence attitude and increase self-esteem and confidence. Opportunities would be available to share ideas, concerns, problems and success as well as individuals would have an opportunity for immediate feedback on all phases of the teaching-learning exchange from planning to evaluation.

SUMMARY

A key concern, is not whether or not an individual's teaching style preference is teacher-centered or learner-centered, but in understanding what that interpretation means, what factors influence or contribute to the preference, determining consistency between personal values and philosophy and style preference, adjusting for inconsistencies and learning to adapt method and situational factors to establish the most effective teaching-learning interaction.

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FACTORS RELATED TO TEACHING STYLE PREFERENCE OF OHIO COOPERATIVE EXTENSION SERVICE FACULTY AND PROGRAM STAFF

A Critique

Gary E. Briers, Texas A&M University--Discussant

Education, experience, personality, situation, personal preference, and other factors influence teaching style. And teaching style influences learning. So, studying factors related to teaching style of teachers is important if we want to maximize student learning. Thus, this research is valuable. The underlying foundation upon which the study is built was well-documented and presented. Methodology used in the study was appropriate and was described carefully. Then, results and conclusions were presented to accomplish the objectives. Conclusions not only were supported by the findings but also were related to previous research. This integration was most helpful. I applaud the authors for the systemacy of their research.

What might be changed? Improved? A careful edit would improve the readability of the manuscript. (An ellipsis is 3 dots; possessive "its," not "it's" or "its'"; "possess," not "posses"; "however" when used as a conjunctive adverb--not as a simple conjunction--is punctuated with a semicolon preceding and a comma succeeding.) Now, I know that all of you will read my comments not for their content but to catch all of my typos and incorrect uses of punctuation. Undoubtedly, there are plenty of them. But we should all strive for the "cleanest" manuscript possible. Objective one was to describe Extension faculty and staff on all characteristics (some 13 variables). This was not accomplished completely in the paper (current professional position, gender, age, etc?). Similarly, objective two was not accomplished fully. Neither of these objectives, however, was essential to our understanding of this research or of its results and conclusions. Objectives three and four were the real "meat" of this effort. And they were accomplished. The restriction on length of this report limits our understanding of the instruments measuring subjects' attitudes toward their role as adult educators and their knowledge of adult education principles and practices. If objectives one and two are removed, additional explanation of these variables would be possible. Perhaps the researchers could reference a source of these instruments and of information about them. The findings related to these variables are extremely important to the study; the poor scores suggest a moral problem or job dissatisfaction and lack of knowledge of their roles. These points need to be emphasized and examined. Is there a relationship between attitude and teaching effectiveness, between knowledge and teaching effectiveness? If the Ohio Cooperative Extension Service has a measure of effectiveness of its faculty, then this variable needs desperately to be examined along with the variables assessed in this study. Now, isn't that the "norm" with most research--that it "opens up" more questions than it answers?! Also, I realize that this suggestion is beyond the scope and purpose of this study. So, now the researchers have further work to do.

In summary, this research is theoretically sound and practically useful. It contributes to our knowledge base about teaching style; it provides information to be used in the field. The authors capture the ideal when they write that "a key concern is [how] to establish the most effective teaching-learning interaction." Continued programmatic research can bring us all closer to that ideal.

RELATIONSHIP OF ATTITUDE TOWARD TEACHING AT HIGHER COGNITIVE LEVELS TO ASPIRED AND ASSESSED COGNITIVE LEVEL OF INSTRUCTION

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INTRODUCTION

Are professors encouraging students to strengthen their thinking skills? According to Joscelyn (1988), "Everyone agrees that students learn in college, but whether they learn to think is more controversial."

Are professors aware of the cognitive level at which they teach students? Miller (1989) stated, "Instructors, for the most part, appear to be unaware of the fact that various types of discourse, test questions or assignments can prompt student thought at various levels of cognition" (p.175).

Do professors want their teaching to reach higher cognitive levels? When Newcomb and Trefz (1987) asked if professors would welcome changes in the cognitive level of their tests and assignments, 86% indicated a desire to change to higher level testing.

During the early 1980s, several prominent reports alleged that there was a failure on the part of the American education system to encourage students to think. These reports included the 1982 Education Commission of the States which claimed, "the pattern is clear; the percentage of students achieving higher order thinking skills is declining" (Baron & Sternberg, 1987).

These widely read reports cast the American education system into an unprecedented reformation. The goal of the reformation was expansion and enrichment of the intellectual experience of every undergraduate. Thus, educators became an essential component in accomplishing the goal.

American educators, however, had not been singled-out as exemplary models for teaching thinking. In 1984 Halpern wrote, "Traditionally, instruction in how to think has been a neglected component in American education" (p.ix). Such attacks on the American education system prompted a flurry of activity in the area of cognition, but very little research examined the cognitive levels at which professors were actually teaching.

A THEORY FOR COGNITION RESEARCH

The Taxonomy of Educational Objectives: Cognitive Domain, developed by Bloom, Engelhart, Furst, Hill and Krathwohl (1956), was built on a theory of varying levels of complexity (Pickford, 1988) in which cognitive thought and associated behaviors could be classified into six hierarchical levels (Cano, 1988). In the Taxonomy, Bloom argues that accomplishing higher order thinking (application, analysis, synthesis and evaluation) requires some analysis or understanding of the new situation; it requires a background of knowledge of methods which can be readily utilized; and it also requires some facility in discerning the appropriate relations between previous experience and the new situation. Therefore, using Bloom's Taxonomy as a framework for classifying levels of thinking provides focus and direction for teachers interested in improving the quality of learning in their classrooms (Newcomb and Trefz, 1987; Cano, 1988).

Bloom's Taxonomy was condensed by Newcomb & Trefz (1987) from six levels into four levels (see Table 1). The Newcomb-Trefz model of Bloom's Taxonomy was used in this study.

Table 1
Comparison of Blooms's Taxonomy and The Florida Taxonomy of Cognitive Behavior

Bloom's Taxonomy	Newcomb-Trefz Model
Knowledge Comprehension	Remembering
Application Analysis	Processing
Synthesis	Creating
Evaluation	Evaluating

PURPOSE AND OBJECTIVES

The purpose of this study was to describe the aspired cognitive level of instruction and assessed cognitive level of instruction of selected professors in a College of Agriculture, and determine the relationship of these variables to attitude toward teaching at higher cognitive levels. The objectives of this study are expressed in the following research questions:

1. At what level of cognition do participants aspire to teach?
2. At what level of cognition are participants actually teaching?
3. Among participants, what is their attitude toward teaching at higher cognitive levels?
4. What is the relationship between aspired cognitive level of instruction and attitude toward teaching at higher cognitive levels?
5. What is the relationship between assessed cognitive level of instruction and attitude toward teaching at higher cognitive levels?

PROCEDURES

Two professors from each of five subject matter areas in the College of Agriculture at The Ohio State University were purposefully selected. The findings of this study cannot be generalized beyond the ten participants representing Agricultural Economics, Agricultural Education, Agricultural Engineering, Agronomy, Animal Science, Food Science and Technology, Horticulture, Natural Resources, and Poultry Science. Participants completed three instruments and were observed and audio-taped during class sessions three times during Autumn Quarter, 1990.

INSTRUMENTATION

Three of the instruments used in this study, a demographic instrument, an aspired cognitive level of instruction instrument and an attitude toward teaching at higher cognitive levels instrument were developed by the researchers and validated by a panel of experts. Reliability was established using data from the pilot study of 25 college of agriculture faculty members, not included in the research (68% return rate). Reliability of the 50 item, seven point Likert-type attitude toward teaching at higher cognitive levels instrument was established at r = .86 using Cronbach's Alpha.

Additionally, the cognitive level of classroom discourse was described by analyzing in-class discourse and written test items using the Florida Taxonomy of Cognitive Behavior (FTCB) (Webb, 1970), an instrument based on Bloom's Taxonomy (1956). Validity for this instrument was based upon its direct development from Bloom's Taxonomy. Reliability of the rater (.98) was established by coding videotapes of professors of agriculture which were on file in the departmental library.

COLLECTION

One week prior to Autumn Quarter, 1990, a research assistant met individually with each participant to review the Newcomb-Trefz model, collect demographic information, deliver the attitude toward teaching at higher cognitive levels instrument for completion by the faculty member, and determine their aspired cognitive level of instruction. To determine aspired cognitive level of instruction, participants placed 10 chips, in proportion to their aspiration, on four quadrants drawn on a posterboard marked remembering, processing, creating, and evaluating (the levels of cognition in the Newcomb-Trefz model). The proportion of chips placed on each quadrant was recorded as a portion of one hundred, thus revealing the aspired level, in percentages, at each level of cognition. The process was repeated for discourse, and written test items.

The second, fifth, and eighth weeks of the quarter, the researcher audiotaped each class session and assessed cognitive level of instruction for the session. The researcher also assessed the cognitive level of each test item using the Newcomb-Trefz model and the categories on the FTCB, and then met with faculty members to reach consensus as to the classification of each item. Reliability (.96) for these assessments was established by assessing tests on file from a previous study.

ANALYSIS OF DATA

For each variable, measures of central tendency and frequency distributions were calculated using SPSSx/PC+. Pearson Product Moment Coefficients of Correlation (r) and Spearman Rho (p) Coefficients of Correlation were calculated.

RESULTS

ASPIRED AND ASSESSED COGNITIVE LEVEL OF INSTRUCTION

Participants aspired to have approximately 70% of their discourse at the remembering and processing levels (see Table 2). Aspirations for discourse at the creating and evaluating levels ranged from 0 to 30% with a mean of approximately 15%. Participants aspired to write three-fourths of their test items at the remembering and processing levels.

Table 2
Aspired and Assessed Cognitive Level of Discourse and Test Items

	Aspired percent			Assessed percent	
Level of cognition	Mode	Mean	Range	Mean	Range
	Discourse				
Remembering	40	39	10-80	42	34
Processing	30	32	10-50	53	38-60
Creating	0, 20	14	0-30	5	2-9
Evaluating	10, 20	15	0-30	<1	<1-1

Aspired and Assessed Cognitive Level of Discourse and Test Items (Continued)

	Aspired percent			Assessed percent	
	Tests	Mean	Range	Mean	Range
Remembering	50	38	10-60	39	0-62
Processing	30	36	20-50	41	0-57
Creating	0, 10	12	0-30	13	0-100
Evaluating	10	14	0-30	7	0-19

As can be seen in Table 2, approximately 95% of the discourse for the participants in this study was assessed to be at the remembering and processing levels. Approximately 80% of the test items were found to be at the remembering and processing levels.

The majority of the participants in this study (6) wrote 30% - 40% of their test items at the remembering level. With the exception of one participant, all wrote 35% or more of their test items at the processing level. One participant wrote 100% of the test items at the creating level while all other participants wrote fewer than 10% of their items at the creating level. The maximum percentage of test items written at the evaluating level was nineteen percent.

ATTITUDE TOWARD TEACHING AT HIGHER COGNITIVE LEVELS

The mean score on the attitude instrument (238) indicated that participants in the study had attitudes which favored teaching at higher cognitive levels. As can be seen in Table 3, participants' scores ranged from 201 - 275 on a scale that ranged from 50 - 300.

Table 3
Participants' Attitude Toward
Teaching at Higher Cognitive Levels

Score	Participants
201 - 225	2
226 - 250	5
251 - 275	3
Total	10

Note: Possible range = 50 to 300
Mean = 238

RELATIONSHIPS

Very little association (see Table 4) was found between aspired and assessed cognitive level of discourse. However, those who aspired to write more test items at the processing and creating levels, were assessed to be writing more test items at the processing and creating levels.

Table 4 reveals that as attitude toward teaching at higher cognitive levels increased, proportion of discourse and number of test items aspired to be written at the remembering level decreased. As attitude toward teaching at higher cognitive levels increased, aspired level of discourse and aspired number of test items at the creating and evaluating levels also increased.

The strongest relationships between assessed cognitive level of instruction and attitude toward teaching at higher cognitive levels were in the area of testing (see Table 4). As attitude toward teaching at higher cognitive levels increased, the number of test items assessed to be written at the remembering, processing, and evaluating levels decreased (strongest relationship at the processing level). As attitude toward teaching at higher cognitive levels increased, the number of test items written at the creating level increased.

Table 4

Relationships Between Attitude Toward Teaching at Higher Cognitive Levels, Assessed and Aspired Cognitive Level of Instruction

Level of cognition	Relationships between...		
	Aspired and assessed cognitive level	Aspiration and attitude	Assessment and attitude
	Discourse		
Remembering	-.02	-.62	.14
Processing	.09	.22	-.17
Creating	.23	.54	.09
Evaluating	.12	.37	.04
	Tests		
Remembering	.23	-.79	-.19
Processing	.42	-.13	-.72
Creating	.59	.80	.54
Evaluating	-.12	.52	-.31

Note: Pearson Product Moment Coefficients of Correlation
Davis Convention, (1971)

CONCLUSIONS

1. The participants in this study aspired to teach and test at cognitive levels higher than those at which they were assessed.
2. Generally, participants in this study who aspired to write test items at the processing and creating levels wrote more test items at the processing and creating levels.
3. Participants in this study had favorable attitudes toward teaching at higher cognitive levels.
4. Faculty members in this study who had more favorable attitudes toward teaching at higher cognitive levels wanted their discourse and testing to be less at the remembering level and more at the creating and evaluating levels.
5. Participants who had a more favorable attitude toward teaching at higher cognitive levels tested less at the processing and evaluating level and more at the creating level.

RECOMMENDATIONS

1. Professors should test less at the remembering level.
2. Professors should make major conscientious changes in their current teaching style to reach the cognitive levels to which they aspire to teach.
3. Students should be tested at the upper levels of cognition only after higher order thinking has been modeled for the students in the classroom.

RECOMMENDATIONS FOR FURTHER RESEARCH

1. Develop a regression model which includes factors that contribute to teaching at higher cognitive levels.

2. Determine the extent to which laboratories, discussion groups, field trips and other activities outside of the classroom situation contribute to higher cognitive levels of instruction.
3. Develop an instrument for assessing classroom discourse that provides the researcher equal opportunities to record behaviors across all levels of cognition.

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RELATIONSHIP OF ATTITUDE TOWARD TEACHING AT HIGHER COGNITIVE LEVELS TO ASPIRED AND ASSESSED COGNITIVE LEVEL OF INSTRUCTION

A Critique

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Teaching, is a complex act, a difficult act to do right--to result in maximum student learning. This learning must be more than remembering information. Such logic led to this study--a significant one. The research is a part of Dr. Newcomb's program to examine cognitive levels of teaching and learning agriculture. The theoretical base for the study is solid. The purpose and objectives are tight and arise from the theoretical base. Measures of reliability, procedures for ensuring validity of instruments used in the study, and methods of data collection were reported so that others might replicate the study. The findings were clearly presented, and the conclusions were based generally on those findings. The recommendations for further research seemed appropriate. So, the research was well done.

But, there might be improvements. Also, there may be misunderstandings from this short summary of the research. Here are suggestions: The ten professors who served as subjects were "purposefully selected"--two each from five subject matter areas. But they "represented" nine subject matter areas. It was unclear from what five subject matter areas the professors were selected; reporting these may be more valuable than reporting what nine areas they "represented." Four references were made to "procedures" that were not reported subsequently in the findings: 1) "demographic instrument," (p. 2 under INSTRUMENTATION), 2) measurement of "aspired cognitive level of instruction" (p. 3 under COLLECTION), 3) "Spearmen Rho (p) Coefficients of Correlation" (p. 3 under ANALYSIS OF DATA), and 4) "Davis Convention, (1971)" (p. 5, Table 4). To avoid confusing the reader, they should be deleted. Table 2 needs to be on one page and headings rearranged for clarity and accuracy. Also, the range of assessed percent of test items at the creating level was reported in the table as 0-10%. But one subject wrote 100% of his or her test items at the creating level. The researchers reported a 7-point response scale, 50 items, and a possible range of scores of 50-300 for the scale on attitude toward teaching at higher cognitive levels. I'm not sure how each point of the response scale was quantified or qualified ("named"). The researchers might include a citation providing readers a source of this information. Conclusions four and five were that subjects who had more favorable attitudes toward teaching at higher cognitive levels wanted or did "less" or "more." However, it was unclear whether they wanted or did "less" or "more" of one level than another or "less" or "more" than subjects with less favorable attitudes. Recommendations (for practice) one and three--albeit good ones--are not based on findings or conclusions. One could recommend that professors should test just as they are at the remembering level. The data reveal that professors were testing at the levels of remembering and creating to which they aspired. But, professors need to test less at "processing level" and more at "evaluating level" to "match" their aspirations.

This study is a valuable contribution to our understanding of factors related to attitude toward teaching at higher cognitive levels. More importantly, it strengthens programmatic efforts to study and to enhance teaching at higher cognitive levels.

RELATIONSHIP OF TEACHER CERTIFICATION METHODS TO FFA AND SAE PROGRAM QUALITY

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INTRODUCTION

School improvement has been a major issue in America for the past several years. The Paideia Proposal (Adler, 1982) and A Nation At Risk (National Commission on Excellence in Education, 1983) are two examples of reports by study groups that have focused on the deficiencies of the public schools in America. These reports find fault with the content of curriculum, the administration of the schools, and the methods that teachers use to teach.

Many believe that the first step in improving education in public schools is to improve teacher education. Without a profession (teachers) possessed of high skills, capabilities, and aspirations, any reforms will be short lived (Carnegie Task Force on Teaching as a Profession, 1986). Newcomb (1977) stressed that the "improvement of instruction or the enhancement of learning begins with the teacher" (p. 4).

However, at the same time that education review commissions are calling for the improvement of teachers, there is a shortage of qualified teachers, especially in the areas of science and math. Factors attributed to this shortage include the general public's low esteem for the profession, low salary, and less than ideal working conditions. A proposed solution to this shortage and to improving the quality of teachers in general is to let prospective teachers with selected credentials into the classroom without completing a teacher education program, or by completing a modified or alternative program.

The use of alternative teacher certification methods is not new. In some areas of education there has been a history of teacher shortages. The vocational education area of agricultural education is an example. The shortage of qualified teachers for agricultural education has been so severe at times that programs have been closed. One solution to help alleviate this shortage is to offer prospective agricultural education teachers alternate methods to achieve certification.

Alternative programs for teacher preparation should assure the same competencies are acquired as those designed for traditional college students. The fundamental differences between alternative and traditional programs should be the audience and the training design, not the content, the rigor, or the expected outcomes (AACTE Position Paper on Alternative Certification, 1985). The available research on alternative certification methods, while not all inclusive, does not seem to support this position. The central question remains: Are the instructors who follow alternative certification methods as well prepared as instructors who complete a regular teacher education program?

Comparing alternately certified instructors to regularly certified instructors is a recommended method of assessing teacher preparation (Evertson, Hawley, & Zlotnick, 1985). Identifying all the components of a quality agricultural education program is not simple. However, two components which are almost universally accepted as integral are the supervised agricultural experience program and the FFA program (Phipps & Osborne, 1988). In a study by McGhee, Cheek, and Rancheron (1988), the preparation and career patterns of agricultural education graduates were investigated. They stated, "Teacher preparation and the process through which teachers become prepared to teach greatly influence the quality of educational programs conducted in the public school" (p. 1). The alternative certification methods open to agricultural education teachers in the secondary schools may not provide the necessary experiences required by the teacher to conduct an effective and complete agricultural education program.

PURPOSES AND OBJECTIVES

The purpose of this study was to investigate the relationship between method of teacher certification in agricultural education and success in conducting a secondary agricultural education program. The regular method of teacher certification was compared to the alternative types of certification methods for agricultural education instructors in secondary schools. The main independent variable was the method a teacher chose to become certified to teach. The dependent variables were supervised agricultural experience (SAE) program activity level and the FFA chapter activity level at the instructor's school.

Specifically, the following hypotheses were investigated in this study:

1. There is a positive relationship between method of teacher certification for an agricultural education instructor and supervised agricultural experience program activity level at the instructor's school.
2. There is a positive relationship between the method of teacher certification for an agricultural education instructor and FFA chapter activity level at the instructor's school.

The following alternative hypotheses were also investigated in this study to control for the variables length of teaching contract and previous enrollment in a secondary agricultural education program by the instructor:

1. There is a positive relationship between length of instructor's teaching contract and supervised agricultural experience program activity level at the instructor's school.
2. There is a positive relationship between previous enrollment by the instructor as a student in a secondary agricultural education program and supervised agricultural experience program activity level at the instructor's school.
3. There is a positive relationship between length of instructor's teaching contract and FFA chapter activity level at the instructor's school.
4. There is a positive relationship between previous enrollment by the instructor as a student in a secondary agricultural education program and FFA chapter activity level at the instructor's school.

PROCEDURES

This study was an ex post facto design. The target population for this study was the 1,192 secondary agricultural education instructors in single teacher departments in eight southeastern states. These teachers were identified from the Agriculture Teachers Directory (1989). A proportional stratified random sample was taken with a precision level of .05 and a 95% confidence level. The total sample size was 300.

A mail questionnaire was developed to gather the necessary data. The first part of the questionnaire gathered information on the independent variables teacher certification, length of teaching contract, and instructor's previous enrollment as a student in a secondary agricultural education program. The second part of the questionnaire gathered data on the supervised agricultural experience program conducted by each instructor. The third part of the questionnaire gathered information about the FFA chapter activity level at the instructor's school.

The content validity of the instrument was established by a review of staff members and graduate students of the Department of Agricultural and Extension Education, University of Florida. The instrument was field tested with eight agricultural education instructors in Florida to check for clarity and completeness of instructions for completing the questionnaire. A prequestionnaire letter was mailed to each teacher in the sample approximately two days before the questionnaire was mailed. The questionnaire was mailed to each teacher in the sample. Nonrespondents were followed up with two reminder memos and two additional copies of the questionnaire. In addition, ten nonrespondents were contacted by phone to determine if nonrespondents differed from respondents. No differences were found.

ANALYSIS OF DATA

To determine the relationships between teacher certification method and the dependent variables, teachers were grouped by certification method. For each teacher a SAE program activity score and a FFA chapter activity score was computed.

Descriptive statistics were used to summarize the data pertaining to individual teachers in the study. Chi-square and phi coefficients were calculated between the three independent variables. Point-biserial correlation coefficients were calculated between the dependent variables and the independent variables. Stepwise multiple regression was used to enter each independent variable into regression equations with SAE program activity level and FFA chapter activity level as the dependent variables. The decision level for significance was set at .05 a priori for all statistical tests.

RESULTS

The SAE program scores ranged from 1.0 to 78.0. The mean score was 46.5. A comparison of the method of teacher certification with SAE program activity scores grouped by approximate quartiles are presented in Table 1. Teachers who had regular certification tended to be evenly distributed throughout the SAE program activity scores quartile ranges. In contrast, the teachers with alternative certification tended to score in the lowest quartile ranges by a 2 to 1 margin with each of the other quartile ranges.

The length of teaching contract was divided into two groups: less than 12 months and 12 months. The two groups were compared with the SAE program activity scores. Although there was not a large difference between the two groups when compared by quartiles, while the majority of the teachers with 12-month contracts did score in the top two quartiles, and even larger majority of the teachers with contracts less than 12-months scored in the lower two quartiles.

Table 1
Method of Certification by Supervised Agricultural Experience Program Activity Score

SAEP Activity Score	Method of Certification			
	Regular		Alternative	
	%	N	%	N
1 - 36	21.4	(34)	41.2	(14)
37 - 49	27.7	(44)	17.6	(6)
50 - 58	25.8	(41)	20.6	(7)
59 - 78	25.1	(40)	20.6	(7)
Total	100.0	(159)	100.0	(34)

Point-Biserial r = .21 (p<.05)

Whether a teacher had previous experience as a student in a secondary agricultural education program was compared to SAE program activity scores. The group of teachers who had been previously enrolled in secondary agricultural education when they were in high school generally had scores that were spread throughout the quartiles. The group of teachers who had not been previously enrolled had scores which placed them in the bottom two quartiles two out of three times.

Point-biserial correlation coefficients were calculated between all the independent variables and SAE program activity level. Although all of the correlation coefficients were statistically significant, the correlations were low. These data are summarized in Table 2.

Table 2
Point-Biserial Correlation Coefficients for the Independent Variables and Supervised Agricultural Experience Program Activity Scores

Variable	SAEP Activity Score
Certification	.21
Contract	.18
Pre-Ag.	.22

p<.05

Step-wise multiple regression was used to enter each independent variable into the regression equation as a separate step with SAE program activity level as the dependent variable. Of the total explained variance in SAE program activity level (.0747), .0453 can be explained by method of teacher certification and .0294 can be explained by length of teaching contract (see Table 3).

Table 3
Step-Wise Multiple Regression of Supervised Agricultural Experience Program Activity Score on the Independent Variables

Independent Variables Entered Step-wise in Equation	R	Partial R-square	Model R-square	F	Prob > F
Certification	.2128	.0453	.0453	8.83	0.0034
Contract	.1715	.0294	.0747	5.86	0.0163
Pre-Ag.	.1237	.0153	.0900	3.09	0.0805

Overall F = 6.06 ($p<.05$)

The FFA chapter activity scores ranged from 0 to 91. The mean score was 40.7. A comparison of the method of teacher certification with FFA chapter activity scores are presented in Table 4. The FFA chapter activity scores of teachers with regular certification tended to be evenly distributed throughout the quartile ranges. Teachers with alternative certification tended to be concentrated in the lowest quartile range.

Table 4
Method of Certification by FFA Chapter Activity Score

FFA Chapter Activity Score	Method of Certification			
	Regular		Alternative	
	%	N	%	N
0 - 27	20.9	(33)	44.1	(15)
28 - 39	24.7	(39)	17.6	(6)
40 - 50	28.5	(45)	11.8	(5)
51 - 91	25.9	(41)	26.5	(8)
Total	100.0	(158)	100.0	(34)

Point-Biserial r = .16 ($p<.05$)

Teachers who were employed on a 12-month contract were more likely to have FFA chapter activity scores which placed in the top two quartiles than teachers employed on a contract that was less than 12-months. Teachers who were former students of a secondary agricultural education program were evenly spread throughout the quartiles. Teachers who were not former students were more likely to have a less active FFA chapter.

Point-biserial correlation coefficients were calculated between the three independent variables and FFA chapter activity level. Although all of the correlation coefficients were statistically significant, the correlations were low. These data are summarized in Table 5.

Table 5
Point-Biserial Correlation Coefficients for the Independent Variables and FFA Chapter Activity Scores

Variable	FFA Chapter Activity Score
Certification	.16
Contract	.23
Pre-Ag.	.21

p<.05

Step-wise multiple regression revealed that of the total explained variance in FFA chapter activity level (.0969), .0583 can be explained by length of teaching contract and .0386 can be explained by previous enrollment by the teacher in a secondary agricultural education program (see Table 6).

Table 6
Step-Wise Multiple Regression of FFA Chapter Activity Score on the Independent Variables

Independent Variables Entered Step-wise in Equation	R	Partial R-square	Model R-square	F	Prob > F
Contract	.2415	.0583	.0583	11.52	0.0008
Pre-Ag	.1965	.0386	.0969	7.90	0.0055
Certification	.0648	.0042	.1010	.85	0.3570

Overall F = 6.89 (p<.05)

CONCLUSIONS

1. The first hypothesis stated that there is a positive relationship between method of teacher certification for an agricultural education instructor and SAE program activity level at the instructor's school. This hypothesis was supported. Therefore, instructors certified to teach by an alternative method were found to be less effective at conducting a supervised agricultural experience program.

2. The first alternate hypothesis stated that there is a positive relationship between length of teaching contract and SAE program activity level at the instructor's school. This hypothesis was supported when the effect of method of teacher certification was controlled. Therefore, it was concluded that teachers with a 12-month contract conducted a more active supervised agricultural experience program.

3. The second alternate hypothesis which stated there was a positive relationship between previous enrollment by the instructor as a student in a secondary agricultural education program and SAE program activity level at the

instructor's school was not supported when method of teacher certification and length of teaching contract were held constant. Therefore, teachers who were not previously enrolled as a student in a secondary agricultural education were as effective at conducting a supervised agricultural experience program as teachers who were previously enrolled.

4. The second hypothesis of this study stated that there is a positive relationship between method of teacher certification for an agricultural education instructor and FFA chapter activity level at the instructor's school. Because this hypothesis was not supported, it was not possible to conclude that method of teacher certification affected the FFA chapter activity level, beyond the effects of the other independent variables.

5. The third alternate hypothesis which stated there was a positive relationship between length of instructor's teaching contract and FFA chapter activity level at the instructor's school was supported. It was concluded that teachers with a 12-month contract have a more active FFA chapter.

6. The fourth alternate hypothesis stated there is a positive relationship between previous enrollment as a student in a secondary agricultural education program and FFA chapter activity level at the instructor's school. This hypothesis was supported when the effects of length of teaching contract was controlled. Therefore, teachers who were previously enrolled as a student in a secondary agricultural education program conducted a more active FFA program.

RECOMMENDATIONS

The following recommendations are made on the basis of the findings of this study:

1. Research should be conducted to determine additional variables that explain variance in supervised agricultural experience program activity level and FFA chapter activity level.

2. Further research should be conducted which measures the type and quality of experiences the teacher had as a student in secondary agricultural education.

3. Research should be conducted which more closely examines each of the different methods of alternative teacher certification and their effects on the teacher's ability to conduct an effective supervised agricultural experience program.

4. Schools that desire a more active supervised agricultural experience program should hire teachers with a college degree in agricultural education and employ them on a 12-month contract.

5. Schools that desire a more active FFA chapter should employ the agricultural education instructor on a 12-month contract and select those teachers who are former secondary agricultural education students.

6. Teacher certification agencies should examine the content and quality of the supervised agricultural experience program component in their alternative certification methods.

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RELATIONSHIP OF TEACHER CERTIFICATION METHODS TO FFA AND SAE PROGRAM QUALITY

A Critique

Don R. Herring, Texas A&M University -- Discussant

This was a well organized and well written report of research with many commendable features. The issue of alternative certification programs is of concern in many states, and merits our best efforts to determine their effectiveness in preparing agricultural science teachers. The author is on sound footing to focus on the quality of the teacher as a key ingredient to improving public education. The research design was clearly formulated and appropriate for the study. Data were collected from teachers in eight southern states, which gave good breadth to the population studied. The steps in carrying out the research were described clearly, and the statistical procedures were appropriate. The conclusions can be substantiated by the findings, and appropriate recommendations were made.

While the author did a good job of presented a rationale for the study in the introduction, I would like to see more recent examples of reports by study groups focusing on deficiencies in the public schools. Are the current deficiencies different or the same as those reported in the early 80's at the height of the educational reform movement? Have we made any progress in reforming public education?

I would like to know the rationale for selecting FFA and SAE as the two components to study? Certainly it is appropriate to study these two components, but if we are studying the impact of teacher education on program quality, shouldn't we also focus on the essential content of teacher education --preparing teachers to be effective classroom and laboratory instructors? Why not focus on the pedagogical skills of teachers? Do we avoid this kind of research because it is more difficult? It would also be helpful to know the rationale for selecting the eight states included in the study, and why only teachers in single teacher departments were studied.

Attention was paid to the validity of the instrument, but no mention was made of reliability. Also, the results of the field test should be described. No mention was made of the response rate, so it is not known what percentage of the nonrespondents was represented by the ten nonrespondents followed up by telephone. Some explanation is also needed of how the SAE Program Scores and the FFA Chapter Activity Scores were computed.

I would suggest an additional recommendation for further research -- that research be conducted to determine if other differences exist in the quality of agricultural science teachers between those prepared through regular certification programs and those prepared through alternative certification programs. Are there differences in student learning, organizational and administrative skills, teaching effectiveness, etc.?

THE RELATIONSHIP OF SUPERVISED AGRICULTURAL EXPERIENCE PROGRAM SCOPE AND STUDENT ACHIEVEMENT IN PRACTICAL SKILLS IN AGRICULTURAL SCIENCE

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INTRODUCTION

The supervised agricultural experience program is an essential part of the agricultural education program which consists of three integral components: classroom instruction, supervised agricultural experience, and participation in the FFA. Vocational education, particularly agriculture, has always emphasized the "learning by doing" theory. This theory is exemplified in the SAE program. SAE gives the student the chance to utilize the principles learned in class and apply them to real life situations.

Five studies were conducted investigating the relationship between supervised agricultural experience scope and student achievement. Morton (1978) and Noxel and Cheek (1988) concluded that there was a positive significant relationship between the scope of a student's SAE program and their achievement in agriculture class. However, Potter (1984) who studied students mainstreamed into agriculture programs and Tylke and Arrington (1988) did not find a positive relationship between SAE scope and student achievement. In 1990, Arrington and Cheek examined this relationship once more and discovered that there was a significant positive relationship between SAE scope and student achievement for students in the tenth grade but not for students in the ninth grade.

This study was undertaken to attempt to reconcile conflicts in previous studies done at the University of Florida. A comprehensive study of the literature revealed that the following variables were related to student achievement, along with SAE involvement, and were therefore examined in this study: FFA involvement (Arrington & Cheek, 1990; Cheek & McGhee, 1985; Long & Israelson, 1983; McGhee & Cheek, 1983; Noxel & Cheek, 1988; Potter, 1984; Smith, 1983; Tylke & Arrington, 1988); grade point average (Arrington & Cheek, 1990; Christensen, 1964; Morton, 1978); and student interest in agriculture (Arrington & Cheek, 1990; Christensen, 1964; Neavill, 1973; Noxel & Cheek, 1988; Sjoberg, 1984; Tylke & Arrington, 1988). Socioeconomic status had not been used as a variable in previous studies of this type, but a review of literature found it to be related to student achievement (Coleman, 1940; Lindholm & Rich, 1987; Morgan, 1979), thus it was then added to this study. Three variables, years previously enrolled in vocational agriculture, parental involvement and expectations, and teacher effectiveness were studied in previous studies (Noxel & Cheek, 1988 and Tylke & Arrington, 1988, Arrington & Cheek, 1990), but were excluded from this study. When entered into the multiple regression model, none of the three were significant in explaining variance in student achievement.

PURPOSE AND OBJECTIVES

The primary purpose of this study was to investigate the relationship between supervised agricultural experience program scope and student achievement in Practical Skills in Agricultural Science, the ninth grade agricultural education class in Florida.

The primary research hypothesis stated that there was a positive relationship between achievement gain scores and SAE program scope. In addition, the following alternative hypotheses stated that there was a positive relationship between achievement gain scores and the following independent variables: FFA involvement, student grade point average, student interest in agriculture and socioeconomic status.

PROCEDURES

The design of this study was ex-post facto since the independent variables had already occurred, and the research began by studying the dependent variable. As suggested by Kerlinger (1964), rival hypotheses were stated before collecting data and then tested along with the major hypothesis.

The population for the study consisted of public high school and junior high school classes of Practical Skills in Agricultural Science in Polk County, Florida. A purposive sample of ten of the thirteen schools in Polk County which teach the ninth grade agricultural education class were selected. Polk county is located in central Florida and is a county consisting of both rural agricultural and urban areas. The major agricultural industries in the county are citrus production, cattle production, and ornamental horticulture.

The student achievement instrument items were selected from a test bank developed in 1983 (McGhee & Cheek, 1983). This test bank offered criterion-referenced test items in the major areas covered by the Practical Skills in Agricultural Science class. The test items were field tested and then analyzed for item difficulty, item discrimination, and point biserial correlation. A Kuder-Richardson 20 was calculated for reliability in each subject area and the results were as follows: animal science, .94; agricultural mechanics, .95; leadership, .58; plant science, .86; agribusiness management, .65; and soil science, .79 (McGhee & Cheek, 1983).

Test questions for the achievement test were selected from this test bank based on the Florida Department of Vocational Education Student Performance Standards for Practical Skills in Agricultural Science. Kuder-Richardson Reliability for the pretest was .66 and .80 for the posttest.

Information on each student's SAE was collected by having each student fill out a questionnaire supplying the following data: Description or name of SAE, size of SAE, and income generated. Productive Man Work Units which had been used in previous studies to calculate program scope (McMillion & Auville, 1976; Morton, 1978; Arrington, 1981; Noxel & Cheek, 1988; Tylke & Arrington, 1988; and Arrington & Cheek, 1990) were used to translate the information into the following formula to calculate SAE scope:

$$\frac{I}{20} + \text{PMWUs} + \frac{\text{Teacher Rating}}{2}$$

I = Income

PMWU = Productive Man Work Unit, which is defined as the amount of work accomplished by one person in a ten hour day with typical levels of production practices and equipment.

The teachers were given a guide to follow when rating the students, and their ratings could range from zero (No SAE or inappropriate (non-ag) SAE) to 50 (Appropriate SAE, broad scope, much involvement, good records). This rating was included to help the researcher get a more accurate portrayal of the scope of the student's project.

A second questionnaire was developed to collect data from the students pertaining to the following variables: FFA involvement, student interest in agriculture, and socioeconomic status.

Data was calculated for a final sample of 149 students, and descriptive statistics were conducted to illustrate the characteristics of the sample in respect to the variables. Pearson product moment correlation coefficients were also calculated to determine which of the independent variables were significantly related to the dependent variable at the $p<.05$ level.

RESULTS

The students were given a pretest at the beginning of the school year and an identical posttest eight months later. Student achievement was measured by subtracting the pretest score from the posttest score, and labelling the difference as the gain score, or achievement. The gain scores on the achievement test ranged from -26 to 56. The mean gain score was 9.3, the median gain score was 8.0, the mode was 2.0, and the standard deviation was 13.93.

Table 1 summarizes the SAE scope scores. The scores ranged from 0.2 to 227.2. The mean value was 25.81, the median was 14.8, the mode was 14.3, and the standard deviation was 32.99.

Table 1

Frequency and Summary Statistics for Supervised Agricultural Experience Scope

	Frequencies		
SAE Scope	N	%	Cumulative %
.2- 10.3	38	25.5	25.5
10.4- 14.8	37	24.8	50.3
14.9- 29.0	37	24.8	75.2
29.3-227.2	37	24.8	100.0
Total	149	99.9	
SD = 32.9	M = 25.8		
Mo = 14.3	Md = 14.8		

Students provided information regarding their FFA participation by responding to questions on a questionnaire that determined their FFA involvement. Each answer was assigned a point value, and the teacher was asked to give each student a rating from 0-50 which best described their FFA involvement. Both the total points from the questionnaire and the teacher rating were incorporated into the following formula to arrive at the FFA score for each student:

FFA Participation = (Total points x 4) + Teacher Rating

The FFA involvement scores ranged from 0 to 110. The mean score was 37.95, the median was 32.0, the mode 0, and the standard deviation was 29.10.

Three questions on the questionnaire assessed the student's interest in agriculture. These questions were scored using a Likert Scale, each offering five possible answers, with point values ranging from 1 to 5. The point values were then summed to arrive at an interest score for each student. The scores ranged from 3 to 15, with a mean of 11.07, a median of 11, and a mode of 11. The standard deviation was 2.83. Sixty-three percent of the students had an interest score of 11 or higher indicating that the majority of students enjoyed their agriculture class, were very interested in agriculture, and were likely to pursue a career in agriculture.

To determine grade point average, the students were given a listing of possible letter grade averages, and were asked to circle the grade they believed was most indicative of their average for all their classes that year. The researcher assigned a number value to the letter grades based on a 4.0 scale. The minimum grade point average was 0.0 and the maximum was 4.0. The mean was calculated to be 2.4, the median 2.3, the mode 2.0, and the standard deviation 0.78.

Socioeconomic status was determined by the researcher, using the parents' occupation and educational level. Students were grouped into one of three socioeconomic groups, low, medium, and high. Of the 143 students who responded to this question, 25.2% were classified in the low category, 54.5% were classified in the medium category, and 20.3% were classified as coming from a high socioeconomic background.

Pearson product moment correlation coefficients were calculated for all possible pairs of the variables. The results of this analysis can be found in Table 2. The Pearson Correlation analysis revealed a significant, positive relationship between the dependent variable, student achievement, and one independent variable, grade point average. All other variables in the study, SAE scope, FFA involvement, interest in agriculture, and socioeconomic status had no significant relationship to student achievement in Practical Skills in

Agricultural Science, the dependent variable.

Table 2

Pearson Product Moment Correlation Coefficients for the Variables

Variable	ACH	SAE	FFA	INT	GPA	SES
Achievement	---					
SAE Scope	.082	---				
FFA Involvement	.014	.433*	---			
Interest in Agriculture	-.003	.203*	.462*	---		
Grade Point Average	.170*	.163*	.216*	-.004	---	
Socioeconomic Status	.050	.273*	.350*	.144	.263	---

ACH = Achievement
SAE = Supervised Agricultural Experience
FFA = National FFA Organization
INT = Student interest in agriculture
GPA = Grade Point Average
SES = Socioeconomic Status
* p<.05

CONCLUSIONS

The following conclusions were drawn:

1. Supervised agricultural experience scope as measured by a modified formula using PMWUs and a teacher rating, was not significantly related to student achievement in Practical Skills in Agricultural Science, when achievement was measured by a multiple choice pretest and posttest.

2. FFA involvement was not significantly related to student achievement in Practical Skills in Agricultural Science.

3. Student interest in agriculture was not significantly related to student achievement in Practical Skills in Agricultural Science.

4. Grade point average was significantly and positively related to student achievement in Practical Skills in Agricultural Science.

5. Socioeconomic status was not significantly related to student achievement in Practical Skills in Agricultural Science.

RECOMMENDATIONS

The following recommendations are suggested:

1. Develop a method to more accurately measure SAE scope that is more adaptable to Florida.

2. Involve the teachers in the test development process.

3. Further research needs to be done in this area to investigate the conflicting results between this study and previous studies.

4. FFA appears to be related to several of the other independent variables. Further research needs to be conducted examining the benefits of FFA, and its relationship to various other variables.

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THE RELATIONSHIP OF SUPERVISED AGRICULTURAL EXPERIENCE PROGRAM SCOPE AND STUDENT ACHIEVEMENT IN PRACTICAL SKILLS IN AGRICULTURAL SCIENCE

A Critique

Don R. Herring, Texas A&M University -- Discussant

The authors are to be commended for conducting a study that contributes to the body of knowledge in an area of programmatic research being conducted at the University of Florida. We have been encouraged for years to conduct more programmatic research, and it is good to see someone actually doing it. Previous research provided the basis for the primary hypothesis and the alternative hypotheses to be tested. Other commendable features of this study include the efforts made to get an accurate portrayal of SAE program scope and the use of criterion referenced test items from a test bank representing the state approved curriculum. Too, the manuscript was well organized and written in plain, straightforward language, and the conclusions drawn were based on the findings.

I would suggest a title for the study that would reflect more accurately its scope -- something like "The Relationship of Supervised Agricultural Experience Program Scope and Achievement of Students in an Introductory Agricultural Science Course in Polk County, Florida." I am curious as to the rationale for limiting the study to one county in Florida? Although it is not clear in the paper, I am assuming that teachers in the sample schools administered the achievement tests and collected the other data from the students. If that is the case, wouldn't a random sample of schools from the entire state be possible and make more sense in that the results would then be generalizable? As is, to whom or to what programs can you generalize?

I wonder too about the rationale for selecting ninth grade students to study? Wouldn't a study of older students with more years in the program make more sense because they would have more SAE experiences?

For the achievement test, I like the idea of using test items from the test bank, but there is a concern about the test items being developed in 1983. What about the validity and reliability of the test items today? Have there been no changes in the curriculum content during this time period? Could it be, too, that teachers have focused on the content of items in the test bank, thus confounding the effects of SAE and classroom instruction. Also, there was no information given as to the reliability and validity of the instrument used to collect data on FFA involvement, student interest in agriculture, and socioeconomic status.

This study inquires into a component of the agricultural science program that is near and dear to us. Obviously, further studies are needed to determine the impact of SAE on students, as well as studies to determine the variables that are related to SAE program scope.

EFFECTIVENESS OF WRITING-TO-LEARN ACTIVITIES IN TEACHING SECONDARY VOCATIONAL AGRICULTURE STUDENTS

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INTRODUCTION AND THEORETICAL FRAMEWORK

Why do American high school students write? Most frequently, students write to take notes, copy information, fill in worksheets, and answer primarily objective questions on tests. They write to record what they think they are supposed to learn and then they report in writing what they remember from what someone told them to write. According to Cooper (in Applebee, 1981), current practices fail to develop students' writing abilities and also give students no understanding of the ways in which writing can be most useful to them.

The idea that writing is a method of learning is based on a simple principle: when students write, they process information in a physical, tangible form. Writing activities require students to explore ideas, discover relationships, observe contrasts, sequence ideas, and process information (Fulwiler & Young, 1982; Gage, 1986). McGinley and Tierney (1989) pointed to writing as a means to improve the thinking and reasoning ability of students in academic subjects. Walshe (1987) concluded that writing activities have a high potential for increasing the quality of learning by providing students the opportunity to clarify ideas amassed as a result of being "instructed in" a subject.

Emig (1977) stated that definitions of successful learning have common denominators: the importance of making connective links, of reinforcement, and of what she termed "summarizers." Learning through writing, according to Emig, causes students to become actively involved with information by processing it in a personal way. In describing successful learning strategies, Christie (1986) listed several ways teachers can help make information more meaningful for students: (a) by reconstructing experiences, (b) recounting experiences, (c) narrating; and (d) reporting. Writing-to-learn activities can meet each of these learning conditions. Based upon the work of Bruner and Piaget, Emig (1977) derived three primary ways learning activities should be designed to present information: (1) enactive-learning by doing, (2) iconic-learning by seeing, and (3) representational or symbolic-learning by restatement in words. Emig describes writing-to-learn activities as simultaneously deploying all three methods of dealing with information. Further, Parker and Goodkin (1987) pointed out that the physical act of writing has mental consequences. By writing about information, students reconstruct the process in their minds as a psychological or thinking process--they internalize the activity. The basic premise of writing-to-learn activities is that they they cause students to think, not just record what the teacher has said or what they have read.

Applebee, Langer, and Mullis (1987) conducted a three-year study to investigate the role that writing plays in academic learning and to identify ways writing can be used more effectively in high school classrooms. They concluded that writing can serve as a tool for three thought processes basic to learning: (a) to draw on relevant knowledge and experience in preparation for new activities, (b) to consolidate and review new information and experience, and (c) to reformulate and extend knowledge.

Britton, Burgess, Martin, McLeod, and Rosen (1975) studied 2,000 pieces of writing from British school children ages 11-18. Each item was classified as transactional, poetic, or expressive. Britton et al. found that 63% of the writing pieces were transactional, the purpose of which is to report mastered facts to others (teachers). Poetic (or creative) writing comprised 18% of the sample, and was used more for self-realization than for learning content material. Expressive writing in which students write what they think about the content material represented only 5.5% of the sample. Ironically, the form of writing that, according to theorists, promotes learning more than any other kind of writing is the form of writing used least in traditional classrooms.

Langer (1986) found that notetaking by students focused their attention more on content than did completing study questions or writing essays. However, she found that students thought about the content only as isolated facts and not how facts related to each other. Langer found that students were more likely to think about the meaning of the content when writing essays. In writing essays, students relied less on the text and more on their understanding of the content. In a similar study, Newell (1984), using a case study approach, examined the effects of notetaking, short answer study questions, and analytic essay writing on recall, organization of knowledge, and ability to apply social studies concepts. Newell found no difference in recall of knowledge among the writing activities, but that essay writing helped students synthesize information better than did notetaking or answering study questions.

Experimental studies involving writing-to-learn activities have been conducted at each level of education (Dyer, 1988/1989; Selfe, Petersen, and Nahrgang, 1986; Sharp, 1987; and Willey, 1988/1989) with varying results. When differences were noted, they tended to show increases in achievement of students exposed to writing-to-learn activities over other teaching techniques. However, retention of information was not examined in these studies and attitudes toward writing was a variable only in the study dealing with college students.

PURPOSE AND OBJECTIVES

The primary purpose of this study was to compare the effects of writing-to-learn activities and traditional lecture-discussion activities in teaching a selected problem area of vocational agriculture. The specific objectives of the study were stated as research questions, as follows:

1. What was the effect of writing-to-learn activities, as compared to traditional learning activities, on the achievement of high school vocational agriculture students in North Carolina?

2. What was the effect of writing-to-learn activities, as compared to traditional learning activities, on the retention of subject matter?

3. What was the effect of writing-to-learn activities on the attitudes of high school vocational agriculture students toward writing and learning?

PROCEDURES

The population for this study consisted of ninth grade students enrolled in Introduction to Agriculture and Natural Resources in North Carolina. Since this study was conducted with intact groups, random assignment of students to treatments was not possible. A quasi-experimental design, a variation of the nonequivalent control group design described by Campbell and Stanley, was used for this study.

The necessary sample size for each group was computed using a formula suggested by Hays (1973). The required sample size was determined to be 104 students per group. The sample was drawn from North Carolina junior and senior high schools with four or more classes of the ninth grade course, Introduction to Agriculture and Natural Resources, within 100 miles of Greenville, North Carolina. Classes were randomly assigned to the treatments. A total of 102 students in seven classes served as the comparison group in the experiment. The experimental group consisted of 97 students in six classes. Absences during the time of the experiment and the unavailability of CAT scores (the covariate measure) reduced the sample size to 89 students in the experimental group and 88 students in the comparison group. However, this reduction in sample size resulted in only a slight change (from .50 to .54) in effect size, or the ability to detect differences between the treatment groups.

An instrument was developed by the researcher to collect data related to the dependent variables of achievement and retention of information. Content validity of the instrument was established by a panel of experts consisting of university level agricultural education faculty and secondary vocational agriculture teachers. The instrument was field tested and pilot tested for clarity and reliability using students in two similar classes not participating in the study. The instrument was revised as a result of the pilot test and an item-analysis performed on the instrument. The K-R 20 coefficient of internal consistency for the instrument was .89. The Writing Apprehension Test (WAT), adapted by Selfe, Gorman, & Gorman (1986), was used to measure student attitudes toward writing before and after the implementation of writing-to-learn strategies. The Writing Apprehension Test contained 26 items that were categorized into three factors: (a) enjoyment of writing, (b) attitudes toward having writing evaluated, and (c) confidence in writing ability. Students were asked to respond to a series of statements about writing on a five-point Likert-type scale. Based upon pre-treatment data from students in the experimental classes, reliability as measured by the internal consistency of the instrument was established (Cronbach's alpha = .79).

A unit in groundwater resource protection was selected for this study. Instructional materials for the unit were developed as a result of a nationally funded project by the National Vocational Agriculture Teachers Association and the National FFA Foundation. Prior to the treatment, students in the writing-to-learn treatment groups were administered the Writing Apprehension Test (WAT). The student achievement test and the WAT instruments were administered immediately following instruction in the unit. The student retention test was administered three weeks after the achievement test. In order to control for possible preexisting group differences, California Achievement Test scores were collected to be used as a covariate measure in the study. To control for teacher effect, the principle researcher was the instructor for both the experimental and comparison groups. Achievement tests, retention tests, and writing apprehension tests were administered by the researcher and scored via an electronic scanner.

Multivariate analysis of covariance (MANCOVA) was used to determine if significant differences existed at the .05 level of significance between the two groups for the dependent measures of achievement and retention. Univariate tests were used as follow-up tests to determine the sources of significant difference. The data were also described using measures of central tendency, measures of variance, frequencies, and percentages. A Wilcoxon Sign Rank Test was used to compare students' scores on the Writing Apprehension Test from before they were exposed to the writing-to-learn treatment to their scores after the treatment.

RESULTS

The results of the achievement test administered immediately following instruction in the unit on groundwater protection and the retention test administered three weeks following the achievement test for both treatment groups are presented in Table 1. The students in the writing-to-learn treatment group had slightly higher California Achievement Test (CAT) scores (the covariate measure) than the students taught by the traditional methods, resulting in adjusted mean scores that more accurately reflected the ability of the students in the study. Scores on the achievement and retention tests are presented in Table 1 as the percentage of correct responses. Students taught by writing-to-learn activities had lower scores on the initial achievement test, but higher scores on the retention test administered three weeks later than did students taught by lecture and discussion methods.

Table 1

Mean Achievement and Retention Test Scores by Treatment Group

Treatment group	Achievement test Observed	Achievement test Adjusted	Retention test Observed	Retention test Adjusted
Writing-to-learn	56.99	56.68	58.13	57.85
Traditional	58.86	59.17	54.60	54.90

Multivariate analysis of covariance showed significant differences among the dependent variables between the teaching methods studied [Hotelling's $T = .039$, $F(2,173)=3.38$, $p=.036$]. Therefore, there was a significant difference at the .05 alpha level between the treatment groups when student achievement and retention of knowledge were considered simultaneously. Since there was no reason to assume that attitude toward writing was related to achievement and retention, the attitude variable was not included in the multivariate analysis.

Follow-up analysis resulted in the following findings:

1. There was no significant difference in student achievement between students taught by the writing-to-learn strategy and students taught by traditional methods, as measured by scores on the student achievement test [$F\ (1,174) = 0.92$, $p = .34$].

2. There was no significant difference in student retention of information between treatment groups, as measured by the student retention test administered three weeks following the student achievement test [$F\ (1,174) = 1.26$. $p = .26$].

3. Although there was no significant difference in retention scores between the two treatment groups, the students in the writing-to-learn group scored lower on the achievement test but higher on the retention test administered three weeks later than students taught by traditional methods (Table 2). This reversal in performance by the groups led the researcher to examine achievement loss, a measure of retention of information, as a means of accounting for the overall difference between the groups detected by the MANCOVA.

Achievement loss was defined as the difference in a student's score on the achievement test and the retention test. Adjusted mean scores for the two treatment groups were used to examine achievement loss.

Table 2

Achievement Loss by Treatment Groups

Treatment group	Achievement test adjusted mean	Retention test adjusted mean	Difference in scores
Writing-to-learn	56.68	57.85	+1.17
Traditional	59.17	54.90	-4.27

An analysis of covariance showed that there was a significant difference in student retention in favor of students taught by writing-to-learn activities as measured by achievement loss (F (1,174) = 6.81, $p < .05$). The reversal in scores for both groups from the achievement test to the retention test accounted for the overall difference detected by the multivariate analysis.

4. To measure changes in attitudes, students in writing-to-learn groups were asked to complete the 26 item Writing Apprehension Test before the beginning of the treatment and again immediately following the unit of instruction. Students were asked to respond to a series of statements about writing on a five-point Likert-type scale with response choices ranging from strongly agree to strongly disagree. A Wilcoxon Sign Rank Test was used to compare pre-treatment with post-treatment attitudes of students in the experimental classes. There was no significant difference in the overall attitudes toward writing for students who were taught by writing-to-learn activities from the beginning to the end of the treatment period as measured by the Writing Apprehension Test ($F = 151.5$, $p = .10$). However, as shown in Table 3, when responses to the 26 items on the instrument were grouped into three factors as cited in previous studies (confidence in writing ability, attitudes toward having writing evaluated, and level of enjoyment of writing), statistically significant differences were found in students' "confidence in writing ability" factor.

Table 3

Summary Table for Factors Related to Attitudes Toward Writing

Factor	Pre-		Post		Difference	
	M	SD	M	SD	M	SD
Enjoyment	20.08	5.80	21.00	6.28	.09	7.43
Evaluation	16.80	4.76	17.18	4.44	.38	5.81
Confidence	37.92	9.21	40.62	9.49	2.70	9.97

Although there were no differences found in students' level of enjoyment from writing or in their attitudes toward having writing evaluated, the Wilcoxon Sign Rank statistic for difference in confidence in writing abilities as a result of writing-to-learn activities was significant

(S = 200.5, p = .04). Students in the writing-to-learn groups demonstrated a significant positive change in confidence in their writing abilities after only one week of writing-to-learn activities.

CONCLUSIONS

Based upon the findings of this study, the following conclusions were drawn. Writing-to-learn activities are no more or no less effective than the traditional methods of teaching with regard to student achievement. However, students retain more of the information learned (lower achievement loss) with writing-to-learn techniques than with traditional teaching methods. In addition, the confidence of the students in their ability to write was improved as a result of exposure to writing-to-learn activities.

RECOMMENDATIONS

With increased emphasis placed upon effective teaching at all educational levels, it is important that teaching methods used are shown to be effective in terms of commonly accepted measures of teaching effectiveness--student achievement, retention, and attitudes toward the method of teaching. Since agricultural education students taught by writing-to-learn techniques retained more information, this finding would support the continued use of this teaching approach. The improvement in students' confidence in their writing ability further supports the continued use of writing-to-learn techniques.

This study also has implications for additional research involving writing-to-learn techniques:

1. This study was conducted for a period of one week in each of the sample schools. Additional studies should be conducted to determine the effect of writing-to-learn strategies on achievement and retention over a longer period of time.
2. Additional research should be conducted to examine the effectiveness of writing-to-learn techniques with students at different age levels. Perhaps seniors, with more practical experience and a better understanding of course content, would be able to make more connections or links in learning through writing-to-learn activities.
3. Future studies of writing-to-learn strategies should include a second retention test, perhaps six weeks following the end of the unit. Results of this study indicate that the contrast in the amount of knowledge retained by writing-to-learn groups as compared with that retained by comparison groups would be even more dramatic with the passing of more time.

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EFFECTIVENESS OF WRITING-TO-LEARN ACTIVITIES IN TEACHING SECONDARY VOCATIONAL AGRICULTURE STUDENTS

A Critique

Don R. Herring, Texas A&M University -- Discussant

This was an intriguing study. Maybe I liked it because it was different. The researchers did an excellent job of introducing the problem and a good case was built for emphasizing writing as a method of learning. It was refreshing to see a thorough review of literature outside our profession to establish a sound theoretical base for the study. The research questions were stated clearly and succinctly, and I liked the addition of variables to examine that were not included in other studies -- the retention of information and attitudes toward writing.

Efforts were made to improve the validity of the instrument used, and the internal consistency for the instrument was quite acceptable. Efforts were made to control for possible preexisting group differences by collecting California Achievement Test (CAT) scores to be used as a covariate measure. Also, efforts were made to control for teacher effect by having the same instructor for both the experimental and comparison groups. The results of the study were clearly presented.

I would like to know the rationale for selecting ninth grade students to study. Was the possibility of studying older students with more experience in writing considered? An explanation is needed of the "writing-to-learn" activities used to teach the experimental group and the "traditional methods" used to teach the comparison group. Did the "writing-to-learn" activities incorporate the criteria cited in the review of literature? For example, did they incorporate "expressive writing," which according to theorists promotes learning more than any other kind of writing? As stated in your paper, "The basic premise of writing-to-learn activities is that they cause students to think, not just record what the teacher has said or what they have read." Without knowing more about the treatment used, it is difficult to draw definitive conclusions from your findings. Finding no difference in student achievement could be the result of faulty or inadequate treatment. I'm not saying that was the case; it's just that I don't know without more information about the soundness of the "writing-to-learn" activities used. Were experts in this field consulted in designing the activities?

Obviously, more research into this area is needed. But, if additional research supports this technique as a viable learning style for agricultural students, then strategies for teaching "writing-to-learn" activities should be incorporated into pre-service and in-service teacher education programs. Further, curriculum materials should be identified that lend themselves to "writing-to-learn" activities, and effective "writing-to-learn" activities should be designed and disseminated to teachers.

Keynote Address for

1991 NAERM

THE USE AND MISUSE OF CORRELATIONAL AND REGRESSION ANALYSIS IN AGRICULTURAL EDUCATION RESEARCH

J. David McCracken, Professor
The Ohio State University

Here we are in Los Angeles. Los Angeles looks like it is made up of a group of suburbs in search of a city. Nathan Glazer said that "Los Angeles produces less than any other great city of the things that, from a grim, Protestant way of looking at things, anybody really *needs*. Yet it grows like mad" (*Commentary*, August, 1959, quoted in Edelhart & Tinen, 1983, p. 220). Perhaps a reason agricultural education has not grown more in recent years is that we are looking to our future in the same conservative way that the rest of the nation views Los Angeles.

The invitation to present this invited lecture for the National Agricultural Education Research Meeting is sincerely appreciated. I provided the title for my remarks before I wrote the speech. Sholem Asch wrote that "Writing comes more easily if you have something to say" (*New York Herald Tribune*, Nov. 6, 1955, quoted in Tripp, 1970, p. 715). In order to have more to say that is worthwhile, I analyzed three years of research reported in the *Journal of Agricultural Education* in preparation for this lecture. After reading those articles, I decided to focus the presentation on design issues before moving to a discussion of statistical considerations. Too often we make decisions based on statistics without first making sure we have valid data for input into the statistical process.

Definitions of Correlational and Ex Post Facto

The similarities between correlational and ex post facto research are numerous and the differences so small that, in most cases, they can be discussed together under the umbrella heading of associational research. However, most authors do describe some differences between studies which are correlational and those which are ex post facto. Another term for ex post facto studies is causal comparative studies.

"Correlational research involves studying relationships among variables within a single group" (Fraenkel & Wallen, 1990, p. 15). An example of a correlational study would be one that reported the correlation between standardized test scores and college achievement as measured by grade point average. Two scores would be used for each subject. No groups would be compared. The comparison would be between the two sets of scores for each subject. Remember that we are defining correlational studies as those having measures of multiple variables within a single group. Correlational research

> ...can help us make more intelligent predictions....The approach requires no manipulation or intervention on the part of the researcher other than that required to administer the instrument(s) necessary to collect the data desired. In general, this type of research would be undertaken when one wants to look for and describe relationships that may exist among naturally occurring phenomena, without trying in any way to alter these phenomena (Fraenkel & Wallen, 1990, p. 9).

Paper presented as the invited address at the National Agricultural Education Research Meeting, Los Angeles, CA, December 6, 1991

"If a relationship of sufficient magnitude exists between two variables, it becomes possible to predict a score on either variable if a score on the other variable is known" (Fraenkel & Wallen, 1990, p. 277).

"Causal-comparative research involves comparing known groups who have had different experiences to determine possible causes or consequences of group membership" (Fraenkel & Wallen, 1990, p. 15). An example of a causal-comparative or ex post facto study would be where one wanted to learn whether teachers and administrators had different opinions about the responsibility of the schools to offer adult education in agriculture. The comparison is between groups, in this case administrators and teachers.

A correlational study can easily be converted to an ex post facto study. The standardized test scores in the example above could be grouped into the categories of high test scores, medium test scores, and low test scores. We now have three groups of subjects, divided on the basis of their test scores. We can compare the three groups to see if they differ on their college grade point average. What was a correlational study would now be an ex post facto study.

An ex post facto study can easily be converted to a correlational study. The teachers and administrators in the above ex post facto study could be considered as two levels of one variable. We could title the variable as "position held." The question examined would be whether the position of the subject is related to opinions about the responsibility of the schools to offer adult education in agriculture. A point-biserial correlation coefficient would provide a measure of the strength of the relationship between the independent and dependent variables.

Purpose

I have two purposes for this presentation. First, I would like for us to develop an understanding of the static group design as the basis for correlational and ex post facto research. Second, I want us to understand the necessity of and procedures for control of extraneous variables when we conduct correlational and ex post facto research.

STATIC GROUP COMPARISON DESIGN

In the static group comparison design, two or more intact groups are studied. Comparisons are made between groups which have received different treatments or which represent different groups. Subjects have *not* been assigned randomly to group.

Campbell and Stanley stated that the static group comparison design "is a correlational design of a very weak form, implying as it does the comparison of but two natural units, differing not only in the presence and absence of X, but also in innumerable other attributes... We are left with a general rule that the differences between two natural objects are uninterpretable" (1963, p. 64).

With this design there is "no formal means of certifying that the groups would have been equivalent had it not been for the X." Differences "could well have come about through the differential recruitment of persons making up the groups: the groups might have differed anyway, without the occurrence of X" (Campbell & Stanley, 1963, p. 12).

Internal Validity Problems

The major threat to the internal validity of the static group comparison group design is selection. Students who participate in vocational education differ in many ways from students who do not participate in vocational education. Differences in outcomes may be due to having or not having had vocational education, but they may be due to differences in background and environment. Failure to control for these rival explanations renders any suggestion of causality invalid.

Experimental mortality is another internal validity concern. We often compare students who have completed vocational agriculture with students who never enrolled. All of the students who begin a program of vocational agriculture do not complete it. Experimental mortality would have occurred between the beginning and the end of the "treatment." A more fair comparison would be between all who took at least one semester of vocational agriculture with those who took none.

The location in which alternative "treatments" occur may also introduce an internal validity problem to this design. The environment in which one level of the independent variable takes place may be quite different from the environment in which other levels of the independent variable takes place. These differences in environment may result in different outcomes, which should not be attributed to the "treatment."

The Problem of Establishing Causality

"Although the discovery of a correlational relationship does not establish a causal connection, most researchers who engage in correlational research are probably trying to gain some idea about cause and effect" (Fraenkel & Wallen, 1990, p. 276). "Studying the relations among variables is not easy. The most severe problem is expressed in the question: Is this relation I am studying really the relation I think it is? This can be called the problem of the validity of relations." "The problem of validity of relations boils down essentially to the question of whether it is *this p* that is related to *q*, or, in other words, whether the discovered relation between *this* independent variable and the dependent variable is truly the relation we think it is" (Kerlinger & Pedhazur, 1973, p. 81).

Asher (1983) reports that a number of writers specify three conditions that must be met in order to infer the existence of a causal relationship between two variables, X and Y. First, the two variables must be related to one another. A zero or negligible correlation between the two variables eliminates the need to work further in a attempt to establish causality.

Second, there must be a time ordering between the two variables. The variable X must be shown to have preceded Y in time. This condition is easy to meet when we are examining the relationship between a high school experience and a college achievement. The high school experience will have preceded the college achievement in time. This time ordering can be more difficult to establish, however. If X is FFA participation and Y is the score achieved on a test of leadership ability, it might be more difficult to establish that FFA participation preceded the leadership ability. It might be just as plausible that leadership ability preceded FFA participation.

Third, we must rule out other factors that might be possible causes of the relationship we are finding between X and Y. It is possible that both the level of FFA participation and the leadership ability of the students is determined primarily by family background factors. There is a potential infinite universe of variables that might be confounding the relationship between X and Y. The choice of which variables to include in our research model is a function of the substantive and theoretical insights into the problem under investigation. We must try to identify confounding variables and formally incorporate them into our model. This process requires scholarship and theory-building prior to instrumentation and data collection. It is in this third area that we, as agricultural education researchers, have failed. We simply have not been controlling for extraneous variables as we have conducted this type of research. We have done nothing to rule out the competing causal factors for our findings.

Need For Theory. Without adequate theory and a solid scientific process, we are in danger of a "faddish discard of old wisdom in favor of inferior novelties" (Campbell & Stanley, p. 2). It is in the arena of theory-building that we, as agricultural educators must devote our attention. The theory supporting the inclusion of variables in the equation requires more effort. It is necessary that we build models indicating the anticipated relationships among variables. Sound scholarship is required in the choice of variables to be included in our models. The testing of these models will then contribute to the advancement of theory. The advancement of theory must be the goal of our research. When we are asked why we chose to research a particular area, how often do we respond with answers relating to the advancement of theory and the furthering of knowledge? This must become the purpose for our research.

Need For Research Hypotheses. "The variables to be included in a correlational study should be chosen based on a sound rationale growing out of experience or theory. The researcher should have some reason for thinking certain variables may be related" (Fraenkel & Wallen, 1990, p. 282). Essentially, ex post facto research is an investigation of relationships between the dependent variable and one or more non-manipulated independent variables. "*It is imperative that the investigator begin with research hypotheses to be tested*" (Warmbrod & Miller, 1974, p. 3). From a theoretical, empirical, or logical-argument base, the investigator must hypothesize the expected relationships between the dependent variable and the other variables selected for investigation. In addition to stating a relationship between variables, the research hypotheses should state the direction of the anticipated relationship. Too often in agricultural education research that is ex post facto or correlational in nature, either no hypotheses are stated or the ones that are stated are null or statistical hypotheses rather than research or alternative hypotheses. Research hypotheses are what we must use.

The Static Group Comparison Design in Ex Post Facto Studies

The only difference between the static group comparison design and an ex post facto design is when the treatment has occurred. A true static group comparison design requires the researcher to begin the research study before the treatment begins and observe and monitor the treatment while it is in process. The ex post facto use of this design begins the observation process after the treatment has already occurred. The research is therefore limited to assessing the results "after the fact."

Remember that we are using ex post facto and causal comparative as synonymous terms. "The group difference variable in a causal-comparative study is either a variable that cannot be manipulated or one that might have been manipulated but for one reason or another has not been. Sometimes, ethical constraints prevent a variable from being manipulated, thus preventing the effects of variations in the variable from being examined by means of an experimental study" (Fraenkel & Wallen, 1990, p. 305).

"The basic causal-comparative approach, therefore, is to begin with a noted difference between two groups--and to look for possible causes for, or consequences of, this difference" (Fraenkel & Wallen, 1990, p. 306). The normal analysis procedure is one that looks for differences between or among groups. The most common statistical procedures that I find in the research done by professionals in agricultural education are the t-test and one-way Analysis of Variance.

The Static Group Comparison Design in Correlational Studies

Most of my Ph.D. level students fail to identify the proper design in correlational studies as the static group comparison. Usually the only difference between an ex post facto study and a correlational study is in the number of levels of the independent variable. Test scores are examples of continuous variables that are often used in correlational research. Each individual test score represents a level of an independent variable. So many levels of the independent variable are present that to draw the design would be very cumbersome indeed. However, the strengths and weaknesses of the relationship being examined are no different than we would find for the static group comparison.

EX POST FACTO AND CORRELATIONAL STUDIES IN AGRICULTURAL EDUCATION

In order to better understand the status of ex post facto and correlational research in agricultural education, I reviewed all the articles in the *Journal of Agricultural Education* from Volume 29, Issue 3 through Volume 32, Issue 2, a 3-year period. I classified 59 articles as ex post facto and/or correlational, an average of 5 articles per issue. Clearly there was more of this type of research reported during that period than either qualitative, descriptive survey or experimental research. I classified the studies as follows: (1) ex post facto studies without control of extraneous variables, (2) ex post facto studies with control of extraneous variables, (3) correlational studies without control of extraneous variables, (4) predictive studies without control of extraneous variables, and (5) correlational and predictive studies with control of extraneous variables. Some of the studies fit multiple categories so the total number reported will be more than the 59 since some were counted more than once. Overall, 76 analyses were conducted without controlling for extraneous variables and one was reported which did control for extraneous variables. I was amazed. We have been talking about control of extraneous variables in our profession since the initiation of this National Agricultural Education Research Meeting. If the last 3-year period is any indication, we have not been putting talk into practice.

Ex Post Facto Studies Without Control

A total of 34 studies were identified that compared intact groups on one or more dependent variables. Examples included comparing computer and non-computer users, comparing grade levels, comparing people grouped by learning styles, comparing teachers with health problems to those without health problems, comparing completers and non-completers, comparing teacher educators and state supervisors, comparing teachers with adult programs with those without adult programs, comparing males and females, comparing FFA officers with non-FFA officers, comparing three levels of management, and comparing teachers with agricultural business personnel. In all of these studies, there was no way to find reasons for differences which were discovered. The subjects may have differed on many other variables in addition to the one that placed them in the groups. The best we can do in this circumstance is describe the ways the groups differ. In limiting our studies to this approach we miss the opportunity to build theory and impact practice.

Analyses used included t-tests, 1-way ANOVA, 2-way ANOVA, the Duncan Multiple Range Test, and Chi Square. Apart from the problem of lack of control of extraneous variables, the major analysis deficiency was the use of multiple t-tests. The probability of a Type I error is equal to the level of alpha when only one test is conducted. However, one study reported 47 t-tests. In this particular case the probability of a Type I error was equal to $1\text{-}(1\text{-alpha})^{47}$. The alpha level was set by the researcher at .05. However, the probability of a Type I error was not .05 but was instead .915.

An Ex Post Facto Study With Control

The only ex post facto study which attempted to control for extraneous variables was one written by Mohd. Ibrahim Nazri and R. Kirby Barrick. It appeared in Volume 31, Issue 2 of the *Journal of Agricultural Education*. The major independent variable in the study had two levels: teachers with and without preservice teacher preparation in Peninsular Malaysia. The dependent variable was level of professional knowledge achievement. The researchers attempted to control the extraneous variables of race, age, gender, teaching experience, teaching location, teaching specialty areas, and inservice education courses completed. The authors followed the steps suggested by Kerlinger (1973, pp. 378-394) to control for selection as a threat to internal validity in ex post facto research.

The procedure involves the examination of three sets of relationships. The first relationship examined is between extraneous variables and the dependent variable. Extraneous variables unrelated to the dependent variable can be eliminated from further consideration. The second relationship examined is between extraneous variables and the major independent variable. Extraneous variables unrelated to the major independent variable can be eliminated from further consideration. The third relationship examined is between the major independent variable and the dependent variable. If a relationship is discovered, any discussion of possible causation must be qualified by an understanding of the extraneous variables which were not previously eliminated from consideration.

In the Nazri and Barrick study, teaching location was an extraneous variable related to both the major independent variable and the dependent variable. The authors conclude that "preservice teacher preparation could offer a plausible explanation for achieving higher professional knowledge competence scores... Teaching in an academic environment offers another plausible explanation for achieving higher professional knowledge competence scores." Those in academic schools were more likely to have preservice preparation and also more likely to score higher on the dependent variable.

The procedure recommended by Kerlinger and used by Nazri and Barrick is somewhat cumbersome. It fails to sort out the variance in the dependent variable explained by each of the independent variables. Therefore, fewer and fewer ex post facto studies are appearing in other disciplines. The trend is towards correlational research studies which can take advantage of correlational and regression analysis techniques. Dummy coding is now being used extensively to allow researchers to use more powerful statistical techniques to analyze categorical variables.

Correlational Studies Without Control

A total of 27 studies correlational studies were identified that failed to control extraneous variables. These studies reported bivariate relationships between independent and dependent variables, correlation matrices, and canonical correlations. The purpose of these studies was primarily to describe relationships which existed. While these studies may be useful in pointing the way for further research, we should realize that no valid explanation of the relationships is possible.

When we select a large number of independent variables and place them in a correlation matrix with a dependent variable, we have a fairly high probability of finding that some of them will be related to the dependent variable in a statistically significant way. The larger the number of our subjects, the more likely we will achieve statistically significant relationships. The relationships we find may be due to one or more confounding variables that may not be in our matrix rather that the variables we have included.

Predictive Studies Without Control

When we place many variables in a stepwise regression analysis and find that one, two, three, or even four of them predict a significant portion of the variance in a dependent variable we have done little to advance science. Yet, this is the approach that was used in most of the 15 studies classified under this heading. Approaches used by agricultural educators in conducting predictive studies were stepwise multiple regression, discriminant analysis, and bivariate regression.

One of my recent graduate students who is now an assistant professor found a variable predicting a statistically significant portion of the variance in percentage of school financial issues approved by voters was the percentage of high school boys basketball games lost. It may be a significant predictor but it is not an explanatory factor.

Correlational Studies With Control

There were no correlational or predictive studies that controlled for extraneous variables in the *Journal of Agricultural Education* during this recent 3-year period. What means might have been employed to control for extraneous variables statistically? There is a Nigerian proverb that says, "Not to know is bad; not to wish to know is worse" (Tripp, 1970, p. 301). Let's look now at a procedure we might use. "Statistical control means that one uses statistical methods to identify, isolate, or nullify variance in a dependent variable that is presumably 'caused' by one or more independent variables that are extraneous to the particular relation or relations under study" (Kerlinger & Pedhazur, 1973, pp. 82-83).

Welch, Anderson, and Harris (1982) conducted a study to explain the proportion of variance in mathematics achievement that could be explained by the number of semesters of high school mathematics taken by students. They first identified potential extraneous variables. Simultaneous regression was used to identify the R^2 or proportion of variance in the dependent variable explained by the extraneous variables. They found an R^2 of .25

(25% variance explained). They then added the semesters of high school mathematics to the regression equation. This increased the R^2 to .59. Semesters of high school mathematics explained 34% additional variance after the variance which could be explained by extraneous variables was accounted for.

The idea is to find the unique variance contributed by an independent variable of interest after the variance contributed by the extraneous variables has been accounted for. McCracken and Etuk (1986) used a similar process when they reported that a set of variables classified as work experiences explained an additional 43% of the variance in the organizational commitment of vocational agriculture teachers, after the variance explained by demographic characteristics and job characteristics had already accounted for 19% of the variance in the dependent variable.

Recommendations

"Progress has no greater enemy than habit" (Jose Marti, *Granos de Oro: Pensamientos Seleccionados en las Obras de Jose Marti*, 1942, quoted in Tripp, 1970, p. 268). As a profession we must break out of the habit of simply describing relationships and differences between and among groups. The explanation of phenomena must become our goal.

As faculty and graduate students we need to develop an expectation of tedium and disappointment and the duty of thorough persistence, by now so well achieved in the biological and physical sciences. We must expand our students' vow of poverty to include not only the willingness to accept poverty of finances, but also a poverty of research results. More specifically, we must devote ourselves to the task of controlling the extraneous variables in our ex post facto and correlational research efforts through the proper use of correlational and regression analysis.

"My joy in learning is partly that it enables me to teach" (Seneca, *Letters to Lucilius* [1st century], quoted in Tripp, 1970, p. 629). My joy in reading the three years of studies from our journal is that it has enabled me to teach through this lecture today. My first goal was that we might develop a better understanding of the static group design as the basis for correlational and ex post facto research. My second goal was for us to understand the necessity of and procedures for control of extraneous variables when we conduct correlational and ex post facto research. I hope these goals have been achieved.

Well, there is a Chinese proverb that says that "Talk does not cook rice" (Tripp, 1970, p. 608). The challenge to those of us who conduct ex post facto and correlational research in agricultural education is to improve the process we follow in conducting our studies. We need to "cook rice" by using proper statistical procedures to control for the extraneous variable problem inherent in the static group comparison design. It is this design that we use more than any other one. We will continue to use it. Let's use it more wisely in the future.

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Alternate Papers

Selected for Inclusion in the Proceedings

IMPROVING SAFETY PRACTICES IN AGRICULTURAL MECHANICS LABORATORIES

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INTRODUCTION

Many agricultural students are exposed annually to equipment, supplies, and situations that potentially could cause serious injury or death (Johnson & Fletcher, 1990). Learning about safety must be an instructional priority for the teacher. Learning activities and work quality take second place to the physical safety of the students and teachers in the laboratory. Therefore, it is imperative that teachers provide a safe and healthy learning environment for students (Pedham, 1990). Since many of these high school students will eventually work in industry and or in their own workshop/home, it is important to teach them to be safe workers (Bekkum & Hoerner, 1980).

Reynolds (1980) indicates that students must develop more than knowledge and skills involved with machine operation. Students must develop an inherent attitude about safety which guides them as they work in the agricultural laboratory. Furthermore, students should be taught that accidents do happen and that conditions which cause accidents to occur can be identified (Reynolds, 1980). The majority of accidents are caused by unsafe actions of individuals (Jacobs & Turner, 1981). Thereby, supporting the belief that teachers need to demonstrate an attitude which reinforces that all safe practices are paramount. This safety attitude is accomplished by teachers wearing appropriate safety apparel, properly maintaining equipment, and modeling the safe usage of equipment (Sullivan, 1990).

There is evidence which indicates that unsafe conditions are found in many agricultural laboratories. Johnson & Fletcher (1990) found that Mississippi secondary agriculture teachers were not using recommended safety practices nor providing students safety and emergency equipment to the extent warranted by the hazards that were present in their agricultural mechanics laboratories. Hoerner & Bekkum (1990) noted that teachers in 7 states reported more than 8 minor laboratory-related accidents per teacher per year. These same teachers indicated that their perceived level of preparation to teach safety was deficient in 11 of 16 important safety areas. More than 57% of these teachers perceived that they were only moderately prepared to teach agricultural mechanics. Burke (1989) studied the accident rate of Virginia agriculture education students and found the annual laboratory accident rate of 5 student accidents per teacher to be excessive. In a Pennsylvania study, Umbaugh (1988) found that 8 of 10 facility safety standards were lacking.

According to Jacobs & Turner (1981) and Storm (1979), 95% of the work-related accidents that occur are caused by errors of individuals. Since laboratory safety for students and instructors is such an important priority for the instructional program, it was felt that a need existed to examine the agricultural mechanics laboratory safety practices used by secondary agricultural instructors in Pennsylvania.

PURPOSE AND OBJECTIVES

The observation of teachers and students working in laboratories in the state and a review of related research indicated that the safety practices of secondary agricultural mechanics teachers should be identified. Another purpose for this study was to provide insights on how to better instruct preservice teachers on laboratory safety instruction and to provide inservice to existing teachers. Specific objectives of the study were to:

1. determine laboratory safety instructional techniques used by agricultural mechanics teachers in Pennsylvania;

2. identify safety instructional materials used by agricultural mechanics teachers to teach laboratory safety; ,

3. determine the availability of safety equipment and materials in agricultural mechanics laboratories in Pennsylvania; and

4. determine differences in teacher perception toward selected safety topics and their self- rated ability to teach selected safety topics.

PROCEDURES

The study utilized a descriptive survey research design. The population for the study consisted of all self-identified agricultural mechanics teachers in Pennsylvania (140 teachers). A random sample of 104 teachers was selected based on a formula provided by Krejcie and Morgan (1970) to reflect a 5% margin of error. The data were collected via self-administered questionnaires. The instrument developed by Hoerner & Kessler (1989) was slightly modified to fit Pennsylvania conditions, and contained two sections. Section one sought to acquire relevant demographic information. Section two was designed to obtain information regarding safety practices, equipment used, instructional methods employed, and materials used in the laboratory. The instrument was examined by four faculty members at The Pennsylvania State University with teaching experience in agricultural mechanics and judged to be valid.

The questionnaires were mailed during the first week of May, 1990. After two follow-ups, 81 teachers responded, yielding a return rate of 77%. Because nonrespondents tend to be similar to late respondents (Miller & Smith, 1983), teachers who responded during the first three weeks were compared to the teachers who responded during the last three weeks. No significant differences were found ($p > .05$) between early and late respondents on variables that measured teachers responses to safety questions. Using data collected from the sample, the post-hoc Cronbach's alpha reliability coefficient of .75 was obtained for the study.

FINDINGS

Objective 1. Determine laboratory safety instructional techniques used by agricultural mechanics teachers in Pennsylvania.

The laboratory safety instructional techniques used by agricultural mechanics teachers are shown in Table 1. The most frequently used laboratory safety instructional techniques were those in which the teacher safely demonstrates the use of power tools (100%), teacher safely demonstrates the use of hand tools (97%), students pass safety exams (97%) and students study safety related subject matter (90%). The safety instructional techniques most infrequently used were unscheduled safety inspections (39%), scheduled safety inspections (23%), students having a copy of eye safety law (16%) and clean up schedules (5%).

Table 1
Instructional Techniques Used by Pennsylvania Agricultural Mechanics Teachers. (n=81)

	USED		NOT USED	
Instructional Techniques	f	%	f	%
Teacher conducts safety demonstrations--power tools	74	100.0	-	-
Teacher conducts safety demonstrations--hand tools	72	97.3	2	2.7
Students pass safety exams	72	97.3	2	2.7
Students study safety subject matter	66	90.4	7	9.6
Students demonstrate safe use of power tools	61	82.4	13	17.6
Students demonstrate safe use of hand tools	58	78.4	16	21.6
Clean up schedule used	53	71.6	21	28.4
Student's safety exams are filed	57	70.4	17	23.0
Clean up schedule--includes cleanup foreman	44	54.3	29	39.7
Unscheduled safety inspection are conducted	29	39.2	45	60.8
Scheduled safety inspection are conducted	17	23.0	57	77.0
Students each have a copy of the Eye Safety Law	12	16.2	62	83.8
Clean up schedule--includes safety engineer	4	5.5	69	94.5

Objective 2. *Identify safety instructional materials used by agricultural mechanics teachers to teach laboratory safety.*

The safety instructional materials used by agricultural mechanics teachers are shown in Table 2. The most commonly used safety instructional materials were manuals and booklets (90%), followed by work sheets (88%), videotapes (72%), slides and film strips (65%) and transparencies (58%). However, a little over two-thirds (68%) of the teachers indicated that they are not using microcomputer programs to teaching safety.

Table 2
Instructional Materials Used by Pennsylvania Agricultural Mechanics Teachers. (n=81)

	USED		NOT USED	
Instructional Materials	f	%	f	%
Manuals and Booklets	67	90.5	7	9.5
Worksheets	65	87.8	9	12.2
Videotapes	53	71.6	21	28.4
Slides and filmstrips	48	64.9	26	35.1
Transparencies	43	58.1	31	41.9
16mm films	32	43.2	42	56.8
Microcomputer programs	23	31.1	51	68.9

Objective 3. Determine the availability of safety equipment and materials in agricultural mechanics laboratories in Pennsylvania.

Data in Table 3 depicts the commonly available safety equipment and materials in Pennsylvania agricultural mechanics laboratories. Safety equipment and materials most commonly available in Pennsylvania agricultural mechanics laboratories were: safety fire extinguishers (93%), welding booths with screen curtains (92%), welding exhaust systems (92%), fire alarms (89%), safety guards on all equipment (88%), first aid kit (80%), marked exits (80%), and safety cans for flammable liquids. Color coded power tools (21%), engine exhaust systems (25%), safety rules posted near power tools (27%) and non-skid areas around power tools (28%) were the least commonly available safety equipment and materials in Pennsylvania agricultural mechanics laboratories.

Table 3
Availability of Safety Equipment/Materials in Agricultural Mechanics Laboratories in Pennsylvania. (n=81)

	Available		Not Available	
Safety/Equipment Materials	f	%	f	%
Safety fire extinguisher	70	93.0	5	6.7
Welding booths with screens/curtains	69	92.0	6	8.0
Welding exhaust systems	69	92.0	6	8.0
Fire alarm	67	89.3	8	10.7
Safety guards on all equipment	66	88.0	9	12.0
First aid kit	60	80.0	15	20.0
Exits marked	60	80.0	15	20.0
Safety cans for flamable liquids	57	76.0	18	24.0
Safety cabinet for explosive materials	51	68.0	24	32.0
Vehicle safety stands available	36	48.0	39	52.0
Fire blanket	35	46.7	40	53.3
Safety zones around power tools	34	45.3	41	54.7
Safety poster posted near power tools	29	38.7	46	61.3
Eye safety law posted	24	32.0	51	68.0
Non-skid areas around power tools	21	28.0	54	72.0
Safety rules posted near power tools	20	26.7	55	73.0
Engine exhaust systems	19	25.3	56	74.7
Color coded power tools	16	21.3	59	78.7

Objective 4. To determine differences in teacher perceptions toward selected safety topics and their self rated ability to teach selected safety topics.

Agricultural mechanics teachers were asked to rate the importance (on a scale 1-5, little importance to very much importance) of 16 safety instructional topics and how well they are prepared to deliver instruction (on a scale 1-5, poorly prepared to very well prepared) on these 16 instructional topics (Table 4). Paired t-test analyses were conducted to determine significant differences between the importance and preparedness score of these 16 topics.

Six of the 16 instructional topics produced significant differences between importance and preparedness. Industrial quality eye protection, Pennsylvania safety laws, safely operating power tools, electrical systems, welding exhaust systems and engine exhaust systems were the safety topics perceived to be significantly more important than teachers believed they were prepared to teach.

There were no significant differences found between importance and preparedness ratings and the following safety instructional topics: fire extinguisher types, first aid materials and accident report forms.

Insert Table 4 about here

CONCLUSIONS AND DISCUSSION

The most commonly used instructional techniques in teaching safety were demonstrations of the safe and proper use of power and hand tools. In addition, most teachers required their students to pass safety exams and study safety related subject matter.

Manuals and booklets, worksheets and videotapes were the instructional materials most frequently used by agricultural mechanics teachers . Microcomputer programs related to laboratory safety were not used by a majority of the teachers. This finding closely parallel the findings achieved by Hoerner and Bekkum (1990) and Johnson and Fletcher (1990). However, videotapes were used comparatively less frequently in the study by Hoerner & Bekkum.

The most frequently available safety equipment and materials were safety fire extinguishers, welding booths with screen curtains, welding exhaust systems, fire alarm, safety guards on all equipments, first aid kits, marked exits and safety cans for flammable liquids. This finding is consistent with the findings of similar studies (Hoerner and Bekkum, 1990 and Johnson and Fletcher, 1990).

The level of self-preparedness of agricultural mechanics teachers was significantly lower than the level of perceived importance for 6 safety techniques (industrial quality eye protection, Pennsylvania safety laws, safely operating power tools, electrical safety, welding exhaust systems and engine exhaust systems). Further, the greatest difference (0.74) between level of perceived importance and level of self-preparedness was observed for the topic, "Pennsylvania safety laws," while there was no difference between perceived importance and self-preparedness for the topic, "safely using hand tools." The findings achieved in this study closely match the findings reported by Hoerner and Bekkum (1990). However, Hoerner and Bekkum (1990) revealed 11 safety techniques where the level of self-preparedness was much lower than the level of perceived importance.

RECOMMENDATIONS

The following recommendations were made based on the findings of the study.

1. Agricultural mechanics teachers should be provided training (both inservice and preservice) relative to the use of safety practices regarding scheduled safety inspections, eye safety laws, and cleanup schedules in agricultural mechanics laboratories.

2. Agricultural mechanics teachers should follow recommended safety practices regarding marked exits (state law requires all exits being marked), color coding power tools, engine exhaust systems, and posted safety rules to protect the health and safety of the students.

3. Safety topics identified by teachers as "important" but not prepared to teach should be taught at the preservice and inservice programs.

4. Further research is needed to identify factors that inhibit teachers from using appropriate safety instructional techniques.

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Table 4
Paired t-test Results for Importance and Preparedness for Teaching Safety Techniques. (n=81)

Safety Techniques	IMPORTANCE[a]		PREPAREDNESS[b]		MEAN DIFFERENCE	T Value
	Mean	SD	Mean	SD		
Administering safety exams	4.05	1.09	4.24	0.89	-0.19	-1.67
Industrial quality eye protection	4.78	0.53	4.23	0.89	0.55	3.60*
Fire extinguisher types	4.53	0.67	4.41	0.81	0.12	1.22
Clean up schedules	3.71	1.02	4.33	0.78	-0.62	-4.90**
Pennsylvania safety laws	3.67	1.10	2.93	1.11	-0.74	4.86**
Safely operating power tools	4.82	0.48	4.51	0.62	0.31	4.33*
Color coding shop tools	3.19	1.06	3.40	1.21	-0.21	-1.69
Safely using hand tools	4.46	0.79	4.46	0.72	0	0
Power tool safety posters	3.58	.94	3.62	0.99	-0.04	-0.36
Power tool operation safety posters	3.43	0.97	3.65	1.04	-0.20	-1.29
Electrical safety	4.48	0.75	4.15	0.79	0.33	3.24*
Lab safety inspections	3.74	0.91	3.81	1.08	-0.07	-0.56
Welding exhaust systems	4.72	0.61	4.22	0.98	0.50	4.34**
Engine exhaust systems	4.33	0.96	4.00	1.09	0.33	4.16**
First aid materials	4.19	1.10	3.99	1.09	0.20	1.65
Accident report forms	3.73	1.00	3.60	1.21	0.13	1.00

[a] importance mean computed on a scale that ranged 1=little importance to 5=very much importance.
[b] preparedness mean computed on a scale that ranged from 1=poorly prepared to 5=very well prepared.
*p<.05; **p<.001

ADMINISTRATOR CHARACTERISTICS IN EXEMPLARY VOCATIONAL EDUCATION

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INTRODUCTION

Attention to excellence in vocational education is most frequently focused toward programs, classrooms, and individual student performance. Research questions are often framed to study the composition of course content, methods of instruction and elements of delivery on the classroom level. The broader context in which learning is nested has seldom been researched, and little study has been devoted in the past toward these larger environments in which vocational programs are found - in this case, the institutions themselves.

Specifically, a study of exemplary institutions may provide better conceptions of quality instruction and learning environments, a sounder foundation from which to predict and support significant change and improvement, and an avenue of improvement by linking the research in vocational education with other efforts to understand and facilitate institutional improvement. This paper represents a part of a larger study, the purpose of which was to provide an understanding of the characteristics or attributes of administrators in institutions in which exemplary vocational education programs exist. This multi-year study, which was begun in 1989, identified several thematic areas which may contribute to excellence in vocational education. Prominent among these thematic areas were administrator characteristics.

PURPOSE AND OBJECTIVES

This paper seeks to describe specific characteristics related to administrators in exemplary institutions of vocational education. Research questions guiding this study were:

1. Are there common essential characteristics associated with administrators in vocational education institutions identified as exemplary and, if so, what are they?

2. If common administrator characteristics are found among institutions identified as exemplary, how is the presence of these elements reflected in different educational levels and types of institutions?

THEORETICAL/CONCEPTUAL BASE AND RELATED LITERATURE

Prior to implementing this research study, the researchers conducted a thorough review of the literature relative to educational excellence and educational administration. A major goal of this literature review was to illuminate the institutional contribution to excellence in vocational education. Since this study primarily utilized naturalistic ethnographic research procedures, it did function from a conceptual base which was grounded in the research literature. However, the literature was a minor factor in the design of the study. Utilizing a body of literature to guide research is largely a positivistic approach which is inconsistent with naturalistic procedures because it may bias the researchers, who act as the primary instruments for data collection. Since individuals are the products of their experiences, acting from such an information base may cause the researchers to assume the perspectives of others rather than developing their own perspectives of the phenomenon as it manifests itself. Such is a goal of naturalistic inquiry.

The literature regarding vocational administrators often tends to focus on leadership behaviors or competencies needed to be a vocational administrator. For example, Liang (1990), Finch, Gregson, and Faulkner (1990) and Moss (1988) studied various aspects of leadership with selected groups of effective vocational educators. All concluded that there are certain attributes or behaviors common to or associated with successful vocational education administrators. Competencies needed by vocational education administrators have been researched and identified by such authors as Norton, Ross, Garcia, and Hobart (1977). Numerous references are also cited in the literature of training programs that have been developed by certain states for their vocational education administrators. However, the determination of characteristics of administrators in effective vocational education institutions has received only limited attention. This is an interesting observation when one considers that the role of the school principal has been found to be consistently associated with effective elementary and secondary schools (Raiche, 1983; Fletcher, 1986; Ogawa and Hart, 1985; Ellis, 1986). Thus, when one considers the point that vocational administrators often perform functions similar to school principals, it seems reasonable to explore the role of administrators in effective vocational education institutions.

RESEARCH METHODS AND PROCEDURES

Naturalistic procedures were used for this study. The study employed an interpretive design that sought meaning and understanding from within the context of the setting. The setting, for the purposes of this study, was defined as institutions offering exemplary vocational education. The overall goal of the project was to identify and document themes that were consistent across these institutions.

The first procedural step was the formation of a carefully selected national resource group. Membership included individuals knowledgeable about vocational education institutional settings and individuals knowledgeable about the study of institutions using naturalistic approaches. Institutions offering exemplary vocational education programs were identified through the use of this resource panel. The resource panel consisted primarily of individuals who were knowledgeable about vocational education on a national level. One member of the resource panel had considerable expertise in the area of school effectiveness and school improvement. Additionally, panel members identified other knowledgeable individuals in the field who, with the panel, assisted in the selection of sites. Based on the input from the panel and the other knowledgeable individuals, a listing of approximately 25 institutions was identified. Comprehensive high schools, secondary vocational centers, postsecondary technical institutes/colleges, and community colleges from across the U.S. were all in this listing. These institutions provided the pool from which sites were chosen for inclusion in the pilot and field studies.

A pilot study was conducted in four comprehensive high schools to develop specific procedures for the research. In consideration of the research design utilized for this study, the researchers served as the instruments for collecting data. Anecdotal and contextual data were collected through researcher observations and interviews. No predetermined criteria were used to guide the observations and interviews (factors to look for or specific questions to be asked) because this would have biased the data collection process.

Field studies were conducted in 11 states at two comprehensive high schools, five secondary vocational centers, four postsecondary technical colleges, three community colleges, and one proprietary postsecondary technical institute. During field site visits, systematic observations and interviews were conducted with representative institution staff members and students. Copious field notes were made of the observations and interviews. Audio tape recordings were also made of selected individual and the majority of the group interviews. These were later transcribed and indexed with the field notes. Joint interpretation and triangulation procedures were used to validate the data collected.

FINDINGS

Major findings regarding the administrators in the exemplary schools were reflected in themes that were consistent across all of the institutions studied, regardless of their level or type. These included: leadership styles, high expectations of self and others, risk-taking, flexibility, and a strong sense of mission and vision. General observations of the research team were that the administrators in these exemplary institutions were very effective and successful. Indeed, the chief administrators in certain schools exhibited characteristics and behaviors that were indicative of exemplary leadership, particularly in the aspect of instilling a sense of mission and vision for their institutions.

Leadership Style

Administrators in this study considered themselves to be very people-oriented. Interviews with staff members generally confirmed this belief. Evidence of this "people orientation" was noted in administrative efforts to involve staff in decisions that directly affected them. Overall, administrators in exemplary schools were concerned about the welfare and needs of their staffs. This concern was reflected in a decision-making process or style best classified as participatory rather than authoritarian. Several administrators, in reflecting on the decision-making processes in their schools, noted that they "had become less autocratic over the years." They specifically noted that when their faculty members were involved in the decision-making processes, thoughtful and considerate decisions were made. Staff members also showed a greater commitment to the decisions made. Another outcome of participatory decision-making was support for (or at the least, less criticism or complaining about) group decisions from staff members who did not agree with or support the majority. It was observed by administrators that such individuals were more supportive because they were part of the final decision.

Consistent with these findings was the observation that administrators in these schools tended to delegate responsibility to other staff members. Faculty and support staff in exemplary schools commented that their administrators "trusted them and let them do their jobs." Although a strong people-orientation was observed in these administrators, interview data also indicated that these individuals possessed high concern for getting tasks accomplished. Perhaps the most interesting finding regarding leadership styles was that administrators in these exemplary schools have developed the ability to insure that tasks are accomplished within an atmosphere of concern for staff involvement and participation. Although not discussed in great detail, researchers observed that tasks were likely being accomplished because people were being given greater personal autonomy and responsibility regarding the achievement of these tasks.

High Expectations

Administrators noted that they had high performance expectations of themselves and their staff members. This concern for high performance expectations was verified by faculty and support staff. The researchers observed that one likely outcome of these high performance expectations was the establishment of a de facto standard of excellence. Although difficult to define, teachers, students, and administrators seem to know when this standard is attained. This standard of excellence is a thread that clearly runs through the activities in exemplary schools. The relationship of this standard to high expectations is that administrators fully expect themselves and their staff members to conduct their duties so as to reach the de facto standard of excellence in their schools.

Risk-taking

Numerous examples of instances where administrators were willing to take risks and initiate new ventures or projects were cited. The risks entailed were largely related to funding. If the projects or new ventures did not succeed, then precious funds would have been expended that could have been used to help develop or expand existing programs. In some cases, the fiscal health of the institution could have been seriously jeopardized. There was a sense that these administrators focused on the advantages to be gained from these risks rather than on the disadvantages or hazards posed by them. One institution challenged the community to collaborate with them in developing a technology center to bring new businesses into the community. If the initiative would have failed, the school would have suffered financially because it had invested a considerable amount of funds in the effort. Another school developed satellite campuses in other countries, again at great expense. There was also the uncertainty that these satellite campuses would function as effectively as they had in the United States due to differing cultural values and traditions. While these are examples of ventures that entailed considerable financial risk, numerous other examples were given where administrators helped institute new programs, promoted cooperative efforts within their communities or other educational institutions, or implemented organizational change. The major risks involved here centered on change, which always has hazardous elements. An administrator in one school noted that one of the keys to his institution's ability to act proactively was the larger than usual proportion of funds (when compared with other schools in their system) in an account specially designated to fund new ideas or initiatives.

In addition to a willingness to take reasonable risks, these administrators demonstrated an ability to foresee trends or events that would have impacts on their schools.

Consequently, they were able to take steps to maximize the positive effects of these events or to minimize the negative effects. One school undertook a major curriculum development project long before the state mandated system-wide change. Another institution was able to obtain expensive state-of-the-art equipment for one of their programs by anticipating a manufacturing company's plans. They knew that this company was looking for a possible training site in which it could install its equipment. Several years before the company made its final decision, this school had built facilities which would accommodate this specialized equipment and, as a result of this foresight, was successful in receiving the equipment grant. The attitude of the administration in this school was characterized in the following way: "I think most schools are reactive to business and industry and we have become pro-active. I think that is a major difference ... between ourselves and many educational organizations." Still another institution realized the potential benefits of computer technology and implemented a computerized registration and fee payment system which greatly reduced the time students spent waiting in line. Students can now register by phone and immediately enter their registration directly into the campus computer system. Many comparable institutions still do not have such systems.

The importance of the administration's role in risk-taking and creating an atmosphere of creativity was perhaps best summarized by the following quote from a technical college assistant administrator:

> **If I were to assess this institution and the reason we have been able to do some of the things that we have done, (it would be) ... the environment of taking chances, the environment of creativity (and) innovation. This is encouraged in this educational environment. I think it goes right back to our board of directors. They promote that. You can make mistakes here .... If we try something and it doesn't work, you know we are applauded for the effort of having taken the chance. I think that (this is a result of) the directors that we have had .... They have been tremendous coaches and are creative futurist kinds of thinkers.**

Flexibility

Flexibility was another trait that faculty members and support staff noted regarding these administrators. They were not locked into traditional paradigms or familiar modes of operation. They encouraged staff members to be creative. They were willing to consider new ideas and proposals. More importantly, they were willing to support these creative ideas and proposals, both financially and with personal encouragement. One faculty member stated,

> **"One of the things that I see that helps (make this school work) is the freedom to try new things. We don't have somebody that says this is the way you must function. ... the freedom to try something different and then to move forward. If it doesn't work then try something different. Go in a different direction.**

The trait of flexibility was sometimes expressed in examples that showed how administrators had circumvented bureaucracies or other systems in order to solve problems. As an illustration of this perspective, one community college administrator worked closely with a faculty member to draw up plans for a new on-campus lab facility to replace a rented facility that required a commute of three miles. Although armed with figures that showed that such a facility could be built and maintained for approximately the same money that was being spent on the rented facility, the central administration board would not commit to building new facilities, primarily due to political considerations. Finally, after several years of exploring alternatives, the administrator and instructor developed a plan which involved the lease of a temporary building which could be constructed on campus. However, this building was designed so that, while it was for all practical purposes a permanent facility, it met the criteria specified for a temporary building. The community college board approved the lease of this facility and it was constructed.

Vision and Sense of Mission

Perhaps one of the most important findings regarding administrators in exemplary schools was their ability to instill a sense of vision and mission within their faculties, support staffs, students, and communities. Not only did administrators clearly articulate their goals and mission for their institutions, but their staff members were able to do so as well. It was observed that people in these schools felt that they knew why they were there and what they were supposed to do. Staff members in several schools commented on the importance of their administrators in establishing this sense of mission. A staff member in one school said, "The reason this school is so successful is because of the vision of (the administrator)." "Having vision" was also cited by several others when describing reasons that their administrators were so effective. Additionally, a faculty member in a postsecondary technical institute stated:

> **There is no question as to what the goals are. That comes right from the top. There is clarity of vision from the (administrative) office, and that clarity of vision is communicated in a variety of ways. I don't think that there are very many instructors that don't have a clear idea of what it is they are supposed to teach.**

Several administrators commented on the importance of creating a vision and sense of mission. These administrators believed that this aspect of their job was extremely important. Consequently, they were devoting more time to these kinds of activities and were delegating more of the day-to-day managerial functions to other staff members.

CONCLUSIONS

The findings noted previously illustrate selected characteristics that were exhibited by administrators in exemplary vocational education institutions. An awareness of these characteristics can be of great value for all vocational administrators and vocational education institutions.

Administrators in these institutions exhibit unique characteristics. As noted previously, their management style creates a climate of trust. They seem to operate on the belief that they hire good people and let them do their jobs. Administrative oversight was not a conspicuous characteristic of exemplary institutions.

While administrators maintained high expectations for themselves and their staff, which are manifested as a "standard of excellence," they were perceived as warm and caring individuals who were perceptive of the personal needs of their students and staffs. If an administrator aspires to excellence, one conclusion which might be drawn is that trust, as a management style, is more effective than authoritarian attention to detail.

These administrators were risk takers. They encouraged and supported their faculty to be creative in designing and delivering education. Further, a climate of creativity expected both success and failure.

In summary, administrators in exemplary vocational education institutions exhibited several common characteristics. These included (a) a people-oriented leadership style, (b) high expectations for themselves and staff members, (c) a willingness to take risks, (d) flexibility, and perhaps most importantly, (e) an ability to establish a sense of vision and mission within the institution.

If these characteristics are identifiable or transferable, then processes could be developed to identify individuals with these skills in order to better prepare them to become administrators. Further, present administrators could improve their effectiveness by studying and/or implementing behaviors consistent with these characteristics.

Knowledge of these characteristics could be used to guide further studies regarding effective vocational administrators.

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AN ASSESSMENT OF TEACHING STRATEGIES USED IN PRIVATE PESTICIDE APPLICATOR EDUCATION

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INTRODUCTION

People have become very concerned about pesticides, how they have been used, and their potential to damage human health, wild life and the environment.

For many years, state cooperative extension systems have provided educational programming focused on the safe handling, use and storage of pesticides. These programs were heavily information-based (Pearson, 1987). The initial intent of this training and education program was to provide information on pesticides that would enable participants to apply and handle them correctly and safely. But these programs quickly become sessions to provide information for passing mandatory certification tests (Peason, 1987). Training was primarily through the use of an illustrated lecture-discussion format.

Some individuals and organizations have questioned just how well these programs were training private applicators. Surveys indicated that training programs were too repetitive, and people were getting tired of them (Mueller, 1988a). Agricultural officials and state legislators have been concerned that farmers, although certified, have received inadequate training relative to the use of agricultural chemicals listed as being restricted by the United States Environmental Protection Agency (Fruhling, 1987). Additionally, many extension programs have been evaluated on subject matter content. Very few extension programs have been studied with a focus on teaching strategies. The process should be as critical as the product of education and training (Cole, 1981). Martin and Omer (1990, p.2) contend that while there is a general recognition that educational practice is important to the education of adults, few studies have been conducted that have placed an emphasis on instructional methods used in adult education in agriculture.

Successful adult educators employ a variety of instructional techniques and strategies, depending on program content, expected outcomes, the learning environment, and available educational resources. Instructional techniques and strategies often evolve naturally from what has to be taught (Knox, 1986).

No one teaching technique is suited to every situation. But how many Extension educators have ventured beyond use of a few tried and true teaching methods? How many Extension educators first analyze a teaching situation before selecting the appropriate teaching method or methods? Extension studies have shown that increasing the teaching methods used in a program will increase the desired behavioral change of learners. A teacher must structure a learning situation so that students can learn (Cole, 1981).

If Extension programs tend to be subject matter-centered, what emphasis is put on the teaching strategies used by Extension educators? What perceptions do these educators have regarding the principles of teaching/learning? What methods and tools are perceived to be the most effective by Extension educators conducting educational programs?

PURPOSE AND OBJECTIVES

The purpose of this study was to identify and assess the teaching strategies used in the training of pesticide applicators by county extension agriculturalists in selected states. The specific objectives of the study were as follows: (1) Identify the perceptions held by county agricultural extension professionals regarding principles of teaching and learning; (2) Identify teaching methods and tools used and perceived to be effective by county agriculturalists; (3) compare perceptions and use of instructional methods/tools based on selected demographic data.

METHODS AND PROCEDURES

The descriptive survey method, sometimes called the normative survey method was used to collect data for this study. This method can be used to process data received by the researcher through observation; whether these data are actually physically observed or "observed" through benefit of questionnaire or poll techniques (Leedy, 1985). A self-administered mail questionnaire was used in the study. The sources of information used in developing this instrument were the instrument used in a study by Martin and Omer (1986) on instructional methods used in adult education and extension programs in agriculture, the instrument used by Odubiyi (1988) on instructional methods used by vocational agricultural instructors in Iowa; input from the Department of Agricultural Education and Studies, and the researcher's personal experience. The instrument used a Likert-type scale to collect data on perceptions. To improve the survey instrument and verify it for content validity, the questionnaire was field-tested by ten county extension agriculturalists not included in the study. The researcher decided to survey county Extension agriculturalists in four of the twelve states within the North Central Region. An assumption was made by the researcher that county Extension agricultural professionals in the United States form a mostly homogeneous group (male with a farm background). Historically, a large portion of Extension professionals have had farm backgrounds (Bachtel, 1989). To reduce the change of a type two error occurring (failure to reject a false null hypothesis), the researcher decided to survey one-half of the county Extension agriculturalists in the four states selected for this study. County extension agriculturalists (153 of 306) in 4 of the 12 states within the Central Region of the United States were asked to participate in the study. States selected for this study were Iowa, Nebraska, North Dakota, and Wisconsin. Iowa was automatically selected to be included in this study because: (1) the researcher was employed by the Iowa Cooperative Extension Service and was familiar with its mission and , (2) Iowa Cooperative Extension Service Administration requested that Iowa be included in this study. The other eleven states were randomly ranked, from one to eleven, by drawing state names from a box. The first three states drawn (Nebraska, North Dakota, and Wisconsin) were included in this study. Permission to conduct this study was received from state Extension administrators in Iowa, Nebraska, North Dakota,and Wisconsin. The states were randomly selected to participate in the study and were limited to four due to availability of funds and approval of administrators at the institution authorizing the study. A systematic sampling plan in which a selection of every other name and address of county extension agriculturalists from the 1989-90 County Agents Directory was used to determine who would receive the questionnaire. There was a 98% return rate (ie. 150 out of 153). Data were statistically analyzed using SPSS/PC+^{tm}, The Statistical Package for the IBM Personal Computer. The .05 level of significance was set a priori as the critical value of analysis. Means, standard deviations, correlations, t-tests and analysis of variance were used in this study. The reliability test for the entire instrument indicated a Cronbach's alpha coefficient of .91.

FINDINGS

Principles

The respondents in this study perceived that several teaching/learning principles were considered highly important. Among those were the following: Comfortable and non-threatening teaching-learning environment (X = 4.65; on a scale where 5 = Strongly Agree and 1 = Strongly Disagree); Use a variety of instructional methods (X = 4.53); Recognize individual differences (X = 4.51); Possess relevant teaching ability (X = 4.39); Clarify objectives (X = 4.33); Identify and use educational principles and procedures (X = 4.29); Use decision making situations in teaching (X = 4.15). Two states tended to put more emphasis on evaluation than the other two states according to the analysis of variance procedure used in this assessment. Table 1 indicates the data on the perceptions regarding the principles of teaching and learning.

Table 1. Means and standard deviations of perceptions held by selected county Extension agriculturalists regarding principles of teaching-learning

In teaching proper pesticide use, etc., county Extension agriculturalists should	Valid cases	Mean	S.D.
Use individualized instruction to help learners solve problems.	135	3.37	1.03
Identify and use educational principles and procedures in teaching.	136	4.29	.63
Use a variety of instructional methods.	137	4.53	.62
Use decision making situations in teaching.	136	4.21	.69
Develop and use a definite and specific interest approach to enhance the learner's motivation.	137	4.15	.75
Prepare instructional plans designed to enhance the teaching-learning process.	136	3.90	.86
Clarify the program objectives to learners.	137	4.33	.65
Evaluate the teaching-learning process.	137	4.04	.73
Use group instruction in dealing with specific problems.	137	3.65	.98
Evalute the product of the teaching-learning situation (i.e., subject matter learned).	136	4.05	.72
Be knowledgeable in each subject matter area taught.	137	3.99	.96
Prepare a comfortable and non-threatening teaching-learning environment.	136	4.65	.49
Possess the relevant and required teaching ability and skills.	137	4.39	.61
Recognize that individual differences exist among learners.	136	4.51	.57
Involve learners in the program planning process.	137	3.36	.92
Prepare and use self-directed teaching-learning aids.	135	3.42	.85
Use a variety of evaluation procedures.	119	3.75	.89

Scale: 1 = strongly disagree, 2 = disagree, 3 = uncertain, 4 = agree, 5 = strongly agree

Methods and Tools

County extension agriculturalists designated 35 mm slides to be the most frequently used teaching tool followed by the overhead projector. The highest rated methods were lecture/discussion, questioning, and lecture. Perceived effectiveness for these three methods was rated lower than perceived use. A low to moderate positive correlation was found between extent of use and perceived effectiveness for 25 teaching methods and instructional tools. The wide variation in mean scores under "extent of use" indicated a number of different approaches were being used by some individuals but the majority seemed to be using a few traditional strategies. Perceived effectiveness did not vary to a great extent from state to state or respondent to respondent. Some states tended to use questioning and discussion more often than others. Videotapes and overhead projectors were used more frequently than other tools in some states. Table 2 indicates the data on extent of use and perceived effectiveness of methods and tools of instruction.

Table 2: Means, standard deviations, and correlations of teaching methods and instructional tools used and perceived to be effective by selected county Extension agriculturalists (N = 92)

Teaching methods and instructional tools	Column A Extent of use		Column B Perceived effectiveness		
	Mean	S.D.	Mean	S.D.	Corr.
35 mm slides	4.52	.80	4.04	.71	.52**
Overhead projector	3.67	1.06	3.65	.82	.54**
Lecture - discussion	3.55	.87	3.79	.73	.54**
Questioning	3.43	.82	3.79	.73	.54**
Lecture	3.39	1.02	3.20	.94	.61**
News stories	3.29	.93	3.28	.73	.47*
Problem solving	3.28	1.03	3.87	.76	.55**
Self study	3.21	1.06	3.41	.93	.51**
Tape recorder	3.14	1.50	3.09	.95	.70**
Group discussion	3.03	.91	3.74	.81	.48*
Individual instruction	2.93	1.05	3.98	.85	.29
Workshops	2.93	1.40	3.57	.98	.52**
Demonstration	2.91	.98	4.08	.71	.42*
Newsletters	2.84	1.23	3.24	.94	.40*
Video tape programs	2.50	1.19	3.70	.86	.25
Case study	2.48	1.20	3.42	1.02	.58**
Radio	2.41	1.27	2.83	.90	.54**
Exhibits	2.27	1.01	3.07	.97	.31*
Pest specimens	2.20	1.14	3.71	.90	.35*
Tours	2.11	1.11	3.57	1.00	.11
Instructional posters	2.10	1.02	2.83	.92	.45*
Chalkboard	2.09	1.03	2.88	.97	.54**
Flip chart	1.95	1.03	2.99	.92	.51**
Motion pictures	1.79	1.04	3.29	.99	.24
Panel discussion	1.73	.94	3.08	1.03	.35*
Television	1.73	1.02	3.03	.93	.25
Brainstorming	1.62	1.06	2.62	1.17	.51**
Computer-aided instruction	1.53	.84	2.99	.97	.30*
Satellite	1.53	.98	3.05	1.03	.11
Buzz groups	1.46	.89	2.48	1.12	.46*
Role playing	1.34	.75	2.35	1.08	.45*
Flannel board	1.30	.62	2.54	1.04	.25

Column A scale: 1 = not used, 2 = rarely used, 3 = sometimes used, 4 = frequently used, 5 = heavily used

Column B scale: 1 = not effective, 2 = of little effectiveness, 3 = somewhat effective, 4 = effective, 5 = very effective

*Low positive correlation.
**Moderate positive correlation

Demographics

Some differences appeared in the findings when compared by demographic data. Younger respondents were more likely to use computers, newsletters and a variety of other tools. Experienced extension professionals tended to use more interactive forms of teaching even though lecture/discussion dominated the findings on methods. Bachelor degree holders felt more strongly than higher degree holders that there was sufficient flexibility in the pesticide training program to try a variety of methods. Major differences in perceptions when compared based on demographics were primarily due to educational level.

CONCLUSIONS, RECOMMENDATIONS AND IMPLICATIONS

The following conclusions were made as a result of this study: (1) The respondents as a whole were not using a variety of teaching methods and tools in pesticide training; (2) The lecture method is the predominant method of instruction in pesticide applicator training; (3) The high regard for selected principles of teaching/learning is not borne out in use of a variety of methods even when the use of a variety of methods/tools was thought by the respondents to be effective.

Based on the findings of this study and the supporting literature, it is recommended that extension educators involved in pesticide training should be offered up-dated instruction in the identified methods and principles of teaching/learning and match methods to needs and subject matter to enhance participative learning. Believing selected methods and tools to be effective and actually putting them into practice are obviously two different things. Inservice education programs need to address this issue if pesticide applicator training and education is to be effective in changing attitudes, and behaviors that affect personal safety and environmental protection.

The major implication to educational practice drawn from this study is that extension education professionals have a need to spend more time on the process of education. Findings in this study support the general need as evidenced by the literature (Knox 1986; Pucel et al, 1988; Martin & Omer, 1990) for enhancing the use of appropriate and effective instructional methods and tools in conducting specific adult education programs in agriculture - particularly pesticide applicator training.

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APPENDIX

A Complete Listing of the Paper Proposals Submitted for Consideration for the 1991 National Agricultural Education Research Meeting, Los Angeles, California.

A Complete Listing of the Paper Proposals Submitted for consideration for the 1991 National Agricultural Education Research Meeting.
Los Angeles, California

The Undergraduate Preparation of Agricultural Education Teachers: What Transcripts Reveal
J. Dale Oliver, Curtis R. Finch, B. June Schmidt and Kuang-Chao Yu,
Virginia Polytechnic Institute and State University

Perceptions of Agribusiness Leaders Toward Agricultural Education in Nebraska
Roy D. Dillon and Allen G. Blezek, University of Nebraska

Perceptions of Agribusiness Leaders Toward Selected Aspects of Agricultural Education in Nebraska
Roy D. Dillon and Allen G. Blezek, University of Nebraska-Lincoln

Leadership Ability of Young Urban Adults in North Dakota
Shane W. Lester, North Dakota State University, Bottineau and
Vernon D. Luft, University of Nevada, Reno

Factors and Persons Influencing High School Students to Enroll in Vocational Agriculture Programs
Vernon D. Luft, University of Nevada, Reno and
Allen D. Giese, Agricultural Education Instructor, Wahpeton, North Dakota

Achievement and Retention of Middle School Science Students in a Laboratory Oriented Agriculture Plant Science Unit of Study
Kevin Enderlin and Ed Osborne, University of Illinois

University Students' Perceptions of Agriculture and Careers in Agriculture
Laurie L. Lancaster and Lou E. Riesenberg, University of Idaho

A Profile of Employment and Related Experiences of 1983 High School Graduates Described Within the High School Curriculum Concentration of the Graduates
Lou E. Riesenberg and Laurie A. Stenberg, University of Idaho

Careers in Agriculture as Perceived by High School Juniors and Seniors
David E. Krueger, Michigan State University and
Lou E. Riesenberg, University of Idaho

Agricultural Education Summer Program Activities
Michael K. Swan, North Dakota State University and
Richard L. Cole, Oregon State University

Perceptions of "Together We Can" National Satellite Conference Attendants Regarding Reform of Agricultural Science and Technology Education in Kentucky
Tony Brannon and Eldon Heathcott, Murray State University

Microcomputer Usage in Kentucky Agricultural Science and Technology Programs
Tony Brannon and C. Dwayne Driskill, Murray State University,
Peter Dreisbach, Kentucky FFA Leadership Training Center and
David Coffey, Western Kentucky University

Learning Preferences of Youth in Nonformal Agricultural Education Programs
Timothy J. Rollins, Jan F. Scholl and Dennis C. Scanlon,
The Pennsylvania State University

Stress and Turnover Among Cooperative Extension System Directors and Administrators
Richard W. Clark, Emmalou Van Tilburg Norland and Keith Smith,
The Ohio State University

Historical Study of Turnover Among Cooperative Extension System Directors and Administrators
Richard W. Clark, Emmalou Van Tilburg Norland and Keith Smith,
The Ohio State University

Self-Perception of Gender Bias Among Women Agriculture Teachers
Richard M. Foster, Joost J. Pikkert and Dann E. Husmann,
University of Nebraska

Early Agricultural Education Teacher Education 1900-1917
John Hillison, Virginia Polytechnic Institute and State University and
Ray V. Herren, The University of Georgia

Relationship of Teacher Certification Methods to FFA and SAE Program Quality
Thomas M. McCall, University of Florida

Secondary Agriculture Teachers' Estimates of Readability and Reading Grade Level of Eleventh Grade Agricultural Education Students
Lori Varner-Friddle, Stacy A. Gartin, Layle D. Lawrence and Kerry S. Odell,
West Virginia University

A Factor Analysis of the Attitude of Agricultural Education Teachers Toward the Use of Microcomputers for Enhancing In-Service Activities
N.L. McCaslin and Robert M. Torres, The Ohio State University

Effectiveness of Writing-To-Learn Activities in Teaching Secondary Vocational Agriculture Students
Rita R. Reaves, East Carolina University and
James L. Flowers and Larry R. Jewell, North Carolina State University

Participant Satisfaction with Off-campus Agricultural Credit Programs at Iowa State University
Bruce E. Miller, Utah State University

An Evaluation of Welding Fumes Evacuation Systems
Clinton O. Jacobs and Glen M. Miller, The University of Arizona

Teaching Styles and Teaching Effectiveness
Leverne A. Barrett, University of Nebraska-Lincoln

Changing Teaching Effectiveness Behaviors Through In-Service
Leverne A. Barrett, University of Nebraska-Lincoln

A Structure for a Research Agenda for Agricultural Education: A National Delphi Involving Internal Experts
Philip Buriak, University of Illinois and Glen C. Shinn, Clemson University

Perceived Components Needed in Programs of Agriculture
Steve Brown, Jefferson City, Missouri and
Bob R. Stewart, University of Missouri

The Instructional Content of Agriculture Programs as Influenced by Semester Courses
K. Eugene Eulinger, Jr., Jefferson City, Missouri and
Bob R. Stewart, University of Missouri

Relationship of Attitude Toward Teaching at Higher Cognitive Levels to Aspired and Assessed Cognitive Level of Instruction
Susie Whittington, University of Idaho and
L.H. Newcomb, The Ohio State University

A Comparison of Native and Transfer Undergraduate Agriculture Students: Academic Aptitude, Achievement and Degree Persistence
Donald M. Johnson, Walter N. Taylor and Emmett T. Kohler,
Mississippi State University

Computer Utilization by Local Vocational Education Administrators in the Southern Region of the United States
Larry R. Jewell and Barbara M. Kirby, North Carolina State University
and Donald R. Herring, Montgomery County Schools, Troy, North Carolina

Relationships Between Teaching Performance and the Selected Variables of Teaching Longevity and Performance on Required Teacher Certification Examinations
Larry R. Jewell, North Carolina State University

How Firm the Foundation? A Look at the Knowledge Base in Agricultural Education Research
Gary E. Moore, North Carolina State University

Competency, Coping, and Contributory Life Skills Development of Eighth Grade Youth
Jeffrey P. Miller, Chevy Chase, Maryland and
Blannie E. Bowen, The Pennsylvania State University

Educational Influences Affecting Decisions Regarding the Continuation of Alternative Agricultural Enterprises as Perceived by Oklahoma Farmers and Ranchers
Rodney Purswell and James Key, Oklahoma State University

A Twenty-Year Evaluation of the California Agricultural Leadership Program
Linda Whent and James G. Leising, University of California

The Relationship of Supervised Agricultural Experience Program Scope and Student Achievement in Practical Skills in Agricultural Science
Randi S. Randell, Agricultural Education Instructor, Live Oak, Florida
and Jimmy G. Cheek, University of Florida

Secondary Agricultural Mechanics Instruction in Nebraska for the 1990's
Neal J. Schlautman, Iowa State University and
Richard M. Foster, University of Nebraska-Lincoln

Competence in Mathematical Problem Solving by Agricultural Education Undergraduates - Fact or Fiction -
Joe A. Gliem and Greg S. Miller, The Ohio State University

Differences on Computing Anxiety, Efficacy and Utility Perceived by Freshman: A Cross College Comparison
Dean Sutphin, Cornell University

Characteristics of the Greenhouse Industry in the Year 2000 with Implications for Curriculum Development in Agricultural Education
Steven D. Kaylor, Agricultural Education Instructor, Canton, Georgia and Maynard J. Iverson and Frank B. Flanders, The University of Georgia

Effectiveness of a State Agriculture in the Classroom Program
Ray V. Herren, The University of Georgia and
Pamela C. Oakley, Agricultural Education Instructor, Monroe, Georgia

A Tri-State Assessment of Current Attitudes Toward Biotechnology Held by Teachers of Agriculture in the Public Schools
Maynard J. Iverson and Dale R. Carpentier, The University of Georgia, David R. Boreing, Agricultural Education Instructor, Jonesborough, Tennessee and Boyd F. Robinson, Maryland State Department of Education

The Pursuit of a College Degree in Agriculture as Perceived by High School Juniors and Seniors
David E. Krueger, Agricultural Education Instructor, Buhl, Idaho and
Lou E. Riesenberg, University of Idaho

Learning and Teaching Styles and Student Performance in a Methods of Teaching Agriculture Course: A Relational Study
Jamie Cano and Bryan L. Garton, The Ohio State University and
Matt R. Raven, North Carolina Department of Public Instruction

The Evaluation of Ohio Vocational Teacher Professional Development Activities: Perceptions of Present and Future Practices
Matthew Hughes and R. Kirby Barrick, The Ohio State University

Who Should be Responsible for Coordinating, Delivering, and Funding Preservice Vocational Teacher Preparation Programs?
Matthew Hughes and R. Kirby Barrick, The Ohio State University

Delphi Study on FFA Issues
Jack Elliot and Tammy O'Connell, Michigan State University

School and Community Decision-Makers' Perceptions About Future Secondary Vocational Education Programs in Agriculture
Jack Elliot, Michigan State University

International Dimensions of Agricultural Education Programs Throughout the United States and Its Territories
John Sabella, Stokes, North Carolina and Barbara M. Kirby and
Joe R. Clary, North Carolina State University

Heroes, Villains, Pretty Girls and Modern Farming Practices: The Contributions of Adolescent Agricultural Novels to Agricultural Education, 1925-1940
Gary E. Moore, North Carolina State University

Factors Preventing Microcomputer Use Among Secondary Agriculture Education Teachers in the United States
William E. Fletcher, Agricultural Education Instructor, Baskin, Louisiana and Jacquelyn P. Deeds, Mississippi State University

Factors Related to Teaching Style Preference of Ohio Cooperative Extension Service Faculty and Program Staff
Brenda Seevers, New Mexico State University and
Richard W. Clark, The Ohio State University

Agricultural Education Graduates: Comparisons of Academic Ability and Teacher Preparation of Those Who Teach and Those Who Do Not
Joe E. Muller, Texas A&M University and
W. Wade Miller, Iowa State University

Processes Used by Selected Illinois Extension Agents (Advisers) to Produce High Quality Programs
Dale A. Law, University of Florida and
Arnold F. Wissemann, Queensland, Australia

Educational Orientation and Job Satisfaction of Extension Field Staff in Michigan
Murari Suvedi, Michigan State University

Australian Secondary Students' Perceptions of Agricultural Careers
Christina L. Cecchettini, Robert Sommer and James G. Leising,
University of California

Farming Systems Research: Impact of Agricultural Extension in Somalia
Gary S. Straquadine and Abdullahi Mohamud Haybe, Utah State University

Factors Associated with Voluntary Turnover Among Cooperative Extension Service Agents
W. Blaine Reynolds, Baton Rouge, Louisana and
Maxie B. McGhee, University of Florida

An Assessment of the Leadership Abilities of Students in the College of Agriculture at North Dakota State University
Leon G. Schumacher, University of Missouri-Columbia and
Michael Swan, North Dakota State University

Perceived Educational Needs/Plans of Oklahoma Agricultural Education Teachers
Johnny Baker and Eddy Finley, Oklahoma State University

Disagreement Among Program Partners Regarding the Value of Student Occupational Preparation and General Benefits Provided by Supervised Experience in Agriculture
R. Kirby Barrick and Matthew Hughes, The Ohio State University and
Matt Baker, California State Polytechnic University

Improving Safety Practices in Agricultural Mechanics Laboratories
Thomas H. Bruening, Tracy S. Hoover and Rama B. Radhakrishna,
The Pennsylvania State University

Agriculturists' Perceptions of Water Quality Education
William W. Hicks, Thomas H. Bruening and Timothy J. Rollins,
The Pennsylvania State University

Predicting Resource Sharing between Secondary School Teachers of Agriculture and Science Departments: A National Study
Thomas J. Dormody, New Mexico State University

Survey of Education In and About Agriculture
Randy Showerman and Jack Elliot, Michigan State University

The Relationship Between the Location of Students' High School and Their Academic Performance in a College of Agriculture
Matt R. Raven, Montana State University and
R. Kirby Barrick, The Ohio State University

A Counseling Tool for Careers in Agriculture
Mary Beth Bennett, Samuel M. Curtis, Arlen W. Etling and Edgar P. Yoder,
Pennsylvania State University and Robert A. Martin, Iowa State University

Characteristics Associated with Subscriber's Use and Their Perceptions of the AgriData Computer Network
Shane D. Sutton and Carl L. Reynolds, University of Wyoming

Administrator Characteristics in Exemplary Vocational Education
Jerome R. Migler, George Wardlow and Gordon Swanson,
University of Minnesota

An Assessment of Teaching Strategies Used in Private Pesticide Applicator Education
John L. Creswell, Extension Crop Specialist, Urbandale, Iowa and
Robert A. Martin, Iowa State University

Supervisory Role Expectations as Perceived by Agriculture Teachers and High School Principals
Robert A. Martin and Dominic M. Nxumalo, Iowa State University

Relationships Between Personal, Family and Extension Position Characteristics and Self-Perceived Effectiveness of Professional Extension 4-H Educators
Robin B. Keyser, Cathy F. Bowen and Rama Radhakrishna,
The Pennsylvania State University

Educational Needs of Adults as Viewed by Secondary Vocational Agriculture Teachers in the Southern Region of the United States by the Use of the Delphi Technique
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